

Just for your
TRS-80* COLOR
TDP System 100
Dragon-32 & MC-10

July 1983

\$2.95 U.K. £2.25

The RAINBOW®

THE COLOR COMPUTER MONTHLY MAGAZINE

Our 2nd Anniversary
Special Edition

Recording Inside!
3 Easy-To-Load
Programs!

Mapping CoCo's
Memory

An Index to Rainbow's
First Two Years

In-Memory Program
Storage

A Quicksort For CoCo

More Than Two Dozen
Product Reviews

t
h
e
R
A
I
N
B
O
W

7/83

Vol. II
No.12

I
N
D
E
X
E
D
I
T
I
O
N



INSIDE:
Escargot
de Scerbo
page
138



THE FROG

27.95 Tape
30.95 Disk

16K Machine
Language

.....ARCADE ACTION.....

This one will give you hours of exciting play...Cross the busy highway to the safety of the median and rest awhile before you set out across the swollen river teeming with hidden hazards. Outstanding sound and graphics.



TOM MIX SOFTWARE

3424 College N.E.
Grand Rapids, MI 49505
(616) 364-4791 or 24 HR. BBS (616) 364-8217

VISA

Arcade Action Games

MasterCard

- Add \$1.00 postage & handling
- Michigan Residents add 4% sales tax
- Looking for new software

By Ken Kalish

.....ARCADE ACTION.....

The "Pitfalls" of this new arcade type game are many. Fight your way through the jungle collecting treasures — as you go. Jump the pits, swing across the alligators while being ever mindful of the terrible creature hiding in the basement. Lots of excitement as you avoid these and many other dangers.....

TRAPPFALL

27.95 Tape
30.95 Disk

16K Machine Language



From Computer Plus to YOU...

PLUS after PLUS after PLUS



Model 12
1 Drive \$2699
2 Drive \$3375



Color Computer 16K \$175
w/16K Ext. Basic \$255
w/ 32K Ext. Basic \$345



Model IV 16K \$849
Model IV 64K
2 Disk & RS232c \$1699



Okidata 80 \$320
Okidata 82A \$399
Okidata 92 \$510



Color Computer Disk Drive
Drive 0 \$470 Drive 1 \$299



Smith Corona TPI
Daisy Wheel \$495

BUY DIRECT Here are just a few of our fine offers...
call TOLL FREE for full information.

COMPUTERS

Model IV 16K	\$849
Model IV 64K	
2 Disk & RS232 c	1699
Color Computer 16K	175
Color Computer 16K	
w/extended basic	255
‡Color Computer 32K-64K	
w/extended basic	345
Pocket Computer 2	165
Pocket Computer 4	59
Model 100 8K	679
Model 100 24K	835
Model 12 1 Drive	2699
Model 16 1 Drive	4199

MODEMS

Hayes Smart Modem II	235
R.S. AC-3	129
R.S. Modem I	129
R.S. Modem II	199

PRINTERS

Smith Corona TPI	495
Epson	Call
CGP-115	199

DMP-100	315
DMP-120	410
DMP-200	599
Okidata 82A	399
Okidata 92	510
Okidata 83A	655
Okidata 93	859
Gemini 10	319
Prowriter	375

DISK DRIVES

Tandon 40 Track	289
Color DR0	470
Color DR1	299

ETC.

CCR-81	52
R.S. Joysticks (pair)	22
16K RAM Chips	25
64K RAM Chips	75
32K Microbuffer Inline	229
Video Plus	24.95
Kraft Joystick (each)	49.95
Disk Controller	199
Serial to Parallel Conv.	69
Superpro Keyboard	69.95

SOFTWARE

	(Tape Version)
Zaxxon	39.95
The King	26.95
Colorpede	29.95
Trapfall	27.95
Pac Attack	24.95
Ghost Gobbler	19.95
Planet Invasion	21.95
Color Zap	9.95
Railrunner	21.95
Space Shuttle	28.95
Typing Tutor	19.95
Color Come	49.95
Telewriter 64	49.95
FHL Flex (Disk)	69.95

Order any two above, take 10% off list.

R.S. Software 10% off list.

Send for complete list.

‡Color Computer 64K requires Disk 0 and D.O.S.

TOLL FREE
1-800-343-8124

computer plus

P.O. Box 926
480 King Street
Littleton, MA 01460
617-486-3193

Write for your
free catalog

We have the lowest possible
Fully Warranted Prices AND
a full complement of Radio Shack
Software.

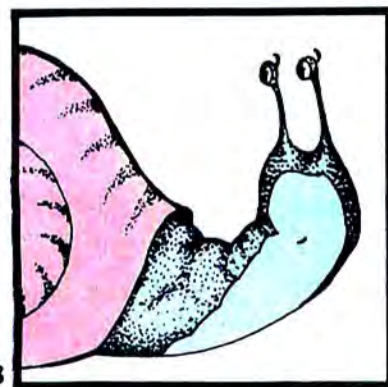
Prices subject to change without notice.
Not responsible for typographical errors.
TRS-80 is a registered trademark of Tandy Corp.



Under the Rainbow



92



138



146

COVER art © by Fred Crawford

Snowflakes In July? / <i>Robert Delbourgo</i>	28
(Graphics) Remember, it's winter Down Under	
MINIDOS Switches Programs / <i>Dr. Laurence Preble</i>	44
(Utility) Keep two programs in memory at the same time!	
Move Over Walt Disney / <i>Scott Bain</i>	53
(Graphics) Now you can do your own animations	
You Spent How Much? / <i>J. D. Ray</i>	60
(Home Help) Analyze and graph Home Finance information	
A Pot Of Disk / <i>Roger Schrag</i>	71
(Disk Utility) A host of new utilities for your disk	
Let's Get Dotto / <i>Daniel W. Phillips</i>	83
(Game) Good old dot-to-dot hits CoCo	
Baseball Statistics Made Easy / <i>Edward R. Carson</i>	92
(Sports) This one does everything but buy you the peanuts and Crackerjack	
CoCo Meets The World / <i>Dennis Meixsell</i>	106
(Hardware) Hook CoCo up to all sorts of things	
Not Just A Sorta Sort / <i>C. J. Stearman</i>	112
(Utility) A quick sorting program (First of two)	
RAINBOWfest Report / <i>Jim Reed</i>	122
(Pictorial) A photo essay	
WHATZIT? / <i>Randall Smith</i>	124
(Word Game) A scrambled word game, that's what	
The Snails Strike Back / <i>Fred Scerbo</i>	138
(Game) We turn the tables on SNAIL INVADERS	
Play It Again, Rainbow! / <i>From All Of Us</i>	146
(Anniversary Special) A record of programs	
Direct Disk Directory Directions / <i>Melvin Hefter</i>	152
(Tutorial) How to use your disk directory	
Shuffle Off In High-Res / <i>Phillip Beistel</i>	196
(Game) Move those numbers around	
Game Train / <i>Jim Schmidt</i>	202
(Game) A game and a memory trainer	
CoCo To Go / <i>Richard Giovanoni</i>	218
(Construction) Build a portable computer center	
Las Vegas CoCo? / <i>Linda Nielson</i>	226
(Statistics) Probable probability problems proven practical	
RAINBUG III / <i>Dan Downard</i>	234
(Utility) More on our ML monitor	
Rainbow Memory Map / <i>Bob Russell</i>	254
(Special) CoCo's most complete memory map — Part I	
Printout At PMode4 / <i>Joseph Kohn</i>	262
(Printers) Dot graphics for Epson and Microline	
Speak Up, CoCo / <i>John Kelty</i>	275
(Hardware) Words from a chip	
Rainbow's Index / <i>Leslie A. Foster</i>	290
(Special) A complete index to our first two years	

Due to family illness, Dennis Lewandowski's Assembly Corner does not appear this month. It will return in August.

Departments

Letters To Rainbow/Our Readers	6
PRINT #-2,/Lawrence C. Falk	13
Editor's Notes	
Building July's Rainbow/Jim Reed	14
A many-hued preview to this month's issue.	
Charlie's Machine/Charles J. Roslund	18
How to make ROM calls easily	
About Your Subscription	232
Back Issue Information	284
CoCo Counsel/Tom Nelson	36
Successful Software Submissions	
Submitting Material To Rainbow	70
Rainbow Scoreboard	90
Education Notes/Steve Blyn	130
Teaching kids to fill out forms	
Basic Training/Joseph Kolar	148
Learn by taking programs apart	
The Pipeline/Staff	164
A special look at a new (PoCo) CoCo	
Using Graphics/Don Inman	168
Making circles and arcs	
Turn Of The Screw/Tony DiStefano	176
Making a ROM Port "Y" Adapter	
The Dragon's Byte/Bill Nolan	178
Combat and CoCo	
Bits And Bytes Of Basic/Richard White	183
Text entry routines	
Received And Certified	224
GameMaster's Apprentice/Bob Albrecht	248
A character-finder program	
Greetings From Uncle Bert/Dale Peterson	285
Our new column on LOGO — for kids and their parents	
Corrections	288
RAINBOW Info	298
Advertiser Index	306

Product Reviews

64K Disk Utilities	284	Home Interest Calculator	50
Alcatraz II	232	Home Money Manager	42
CoCo Accountant	82	Intoduction To Data	
Data-Comp FLEX	240	Communications	24
Datamail	166	McCoCo's Menu	300
Dollars & Sense	300	Moneypak	300
Dungeons of Daggorath	220	Morocco Gran Prix	222
EPROM Programmer	70	Planet Invasion	223
Fastape	221	Robottack	233
FHL FLEX	240	Scramble	43
Filmastr	231	Spectral FLEXPLUS	240
Fraction Math Quiz	167	Stock Option Strategies	201
The Frog	233	TRS-80 Programmer's	
Function Graphing Module	16	Sourcebook	297
Grafplot	158		

NEXT MONTH: Football season starts soon, and the August *Rainbow* will be in the thick of it, with a football game. You can start training early. Also, an excellent new column for educators to go with our fine new LOGO offering.

The memory map will be back — for Part II. It is really a big one and will be with us for a couple more months, yet. And, perhaps, a *very special* report.

Plus . . . some more music, more games and just more of everything — programs, reviews, and information on CoCo than you can possibly find *anywhere* else. Don't miss August's *Rainbow*!

The Rainbow

Lawrence C. Falk
Editor

James E. Reed
Managing Editor

Courtney Noe
Associate Editor

Dan Downard
Technical Editor

Sally Nichols
Art Director

Jerry McKiernan
Assistant Art Director

Valarie Edwards
Jutta Kapfhammer
Suzanne Kurowsky
Editorial Assistants

Bob Albrecht
Steve Blyn
Tony DiStefano
Don Inman
Joseph Kolar
Dennis Lewandowski
Bill Nolan
Dale Peterson
Charles Roslund
Dick White
Contributing Editors

Charlotte Ford
Advertising Manager

Patricia H. Hirsch
General Manager

Donna Shuck
Bookkeeper

Ivanka Kleier
Customer Service Manager

Deidra Henry
Tanya Holder
Monica Wheat
Research Assistants

Wendy Falk
Transportation

The *Rainbow* is published every month of the year by FALSOFT, INC., 9529 U.S. Highway 42, P.O. Box 209, Prospect, KY, 40059. Phone (502) 228-4492. The **RAINBOW** and the Rainbow logotypes are ® Trademarks of FALSOFT, Inc.

Second class postage pending at Louisville, KY. POSTMASTER: Send address changes to *Rainbow*, P.O. Box 209, Prospect, KY 40059. Forwarding Postage Guaranteed.

Entire contents © by FALSOFT, Inc., 1983. The **RAINBOW** is intended for the private use and pleasure of its subscribers and purchasers and reproduction by any means is prohibited. Use of information herein is for the single end use of purchasers and any other use is expressly prohibited. All programs herein are distributed in an "as is" basis, without warranty of any kind whatsoever.

TRS-80, Color Basic, Extended Color Basic, Scripsit and Program Pak are ® trademarks of the Tandy Corp. CompuServe is a ® Trademark of CompuServe Inc.

Subscriptions to the **RAINBOW** are \$22 per year in the United States. Canadian and Mexican rates are U.S. \$29. Surface mail to other countries is U.S. \$57, air mail U.S. \$85. All subscriptions begin with the next available issue.

Limited back issues are available. Please see notice for issues which are in print and costs. Payment accepted by VISA, MasterCard, American Express, Cash, Check or Money Order in United States currency only.

RAINBOW

PAINT 15L: NEW

Editor:

I would like to share with your readers a discovery I have made.

I use and move my computer quite a bit. Hence, there are several places on it where the paint has worn off. A local Radio Shack dealer told me to try an automotive touch up paint.

I found that General Motors makes a color called "Silver Sand," code 15L. It is a perfect match. A company named Dupli-Color markets it in spray cans. Dupli-Color's code is DS-GM 326. Now my CoCo looks new again!

Frank Cerra
Kansas City, MO

RAY LIKES HIS 'K'

Editor:

I received a CoCo for Christmas and got your magazine in January. Your monthly editions have helped me a great deal in understanding different areas of the machine, but what I really want to know is how to gain full usefulness of the memory in my machine.

I have the new version of the CoCo with the 'F' board. What I want to know is why can't I access the full 64K of my chips, and would it be possible to piggyback a set of 64K chips to expand my memory to 64K Extended plus 128 with a DOS. Please help.

Raymond Wise
Stuart, FL

Editor's Note: The 6809 Processor has 16 address lines and therefore can address 64K bytes. You have to have an operating system to tell the processor what to do, such as BASIC. This operating system occupies memory. Therefore the maximum memory accessible is = (64K — operating system). In the case of Extended BASIC this leaves you 32K of user memory as the BASIC ROMs occupy the top 32K.

64K may be better utilized by some of the more sophisticated disk systems and software such as FLEX but at no time can you access more than 64K.

BENJAMIN'S BORDER

Editor:

I enjoyed the article by Ray Gauvreau to put a border around the CoCo screen. I have a 16K standard Color BASIC and was disappointed to read that Ray's program required ECB.

However, with the help of the instruction manual, I made the following changes

and ran the program successfully.
30 POKE 275,63: POKE 276,224
110 IF BN>32767 THEN 100
120 CLS (RND(8)):X=USR(BN)
140 X=USR(BN)
160 X=USR(BN-3)

I had to save the entire program since Color BASIC will not save machine language. Also, if you BREAK after the first RUN, you need to enter RUN 100. Entering RUN will get a SN error.

I spent several hours playing with this program and trying different combinations.

I would like to see more articles for Color BASIC. I do enjoy your magazine.

Benjamin W. Brunotte
Beaumont, TX

LET ME COUNT THE WAYS

Editor:

I thought the review of *Gazon* in your April issue was fair, but there are two things I would like to clear up. First, the game does not require Extended BASIC. Second, you can fire in 32 directions, not eight.

David A. Sweet
(Author of *Gazon*)
Carmel, IN

DISCOVERED BY OCCIDENT

Editor:

With regard to the letter from Mr. R.W. Odlin in your April issue in which he describes the apparently accidental discovery of Japanese characters while using his CGP 115 with the *Telewriter 64* direct printer control command: He must have had DIP switch 4 set to the special characters position and then entered the Hex values for the Japanese Kana character set directly to the printer buffer via the Direct control code command.

The Japanese Kana character set will be selected in the codes A0(Hex) through DF(Hex). This character set is also implemented in the Radio Shack LPVIII if DIP switch 8 is set to the closed position.

I would like to congratulate you on the truly excellent quality of your magazine. It is marketed locally through Atlantic News, which carries the best selection of computer publications to be found in Canada. I would also like to compliment Ms. Sally Nichols and Mr. Jerry McKiernan on the outstanding job they have done in producing your new format. It's absolutely super.

Wishing you every success with your fine publication.

Andrew Gorman
Halifax, N.S. Canada

RAINBOWFEST

Editor:

I am not one to write letters to magazines, but I felt compelled to write this one. I want to thank *Rainbow* magazine for the wonderful time I had at RAINBOWfest. I didn't set up a booth for the show as I didn't really expect that many people to trek to Chicago for a computer show. Boy, was I wrong! If anything would be living proof of the solidarity of the CoCo, it was what took place April 22-24 in the Hyatt-Regency Woodfield in Schramburg. It was great to see the aisles packed with fellow CoCo users and a real pleasure to meet my fellow CoCo advertisers. Though RAINBOWfest would have been very profitable for my company, that would rate a poor second to the experience that I will remember from it. I want to thank you again and am anxiously awaiting RAINBOWfest II. And you can bet that I will have a booth at that one!

Bob Rosen
President, Spectrum Projects
Woodhaven, NY

Editor:

Congratulations, kudos and a thousand thank yous for RAINBOWfest. A success and a pleasure for all involved.

John and Linda Nielsen
Moreton Bay Software
Santa Barbara, CA

Editor:

Just wanted to drop you a short note thanking you for sponsoring the RAINBOWfest. My wife and I learned much . . . and had an excellent time doing it.

We will certainly look forward to the next one!

Again . . . thank you!

Len Baas
Traverse City, MI

Editor:

It was really a pleasure meeting you and some of the other staff members at RAINBOWfest. Everyone I spoke with thoroughly enjoyed it. It's hard to imagine how many people will show up for next year's once they find out how much fun they missed.

Gerry Schechter
Yonkers, NY

Editor:

Thank you and all of the participants at RAINBOWfest who made the show such a success. The vendors who were there were all very pleasant and most helpful. I am writing to express my special thanks publicly to Paul and Susan Petrocci of Petrocci Freelance. Their kindness and consideration to me personally far exceeded that which could be expected of them to extend to a total stranger. I look forward to seeing them again, together with all of the *Rainbow* peo-

ple at next year's show—wherever *the Rainbow* touches down again.

Thomas P. Daly
Waukegan, IL

LLIST RONG

Editor:

Your reviews of our products *Electricity Consumption Monitor* and *LLIST-Rite* were more than we expected. In both cases, the reviewers had done their homework programmatically as well as operationally, with the result of providing prospective purchasers very accurate information on which to base their buy decision. Well done, and thanks to your reviewers for a few compliments along the way.

I would like to point out that the sample output from the *LLIST-Rite* utility on page 204 is not correct. It does represent how *LLIST-Rite* separates complex program statements, but shows each line break with a new line number and (comment). Apparently, either the author or your staff used the ROM *LLIST* function to simulate how *LLIST-Rite* works, but forgot to remove the line numbers and '.

Finally, add my name to the growing list of folks in this business who view *the Rainbow* as not just the best Color Computer magazine, but the best computer information source of its kind!

Tom Mardis
Owner, CoCoDATA Enterprises
Orlando, FL

NO TIRARING PIEDRAS, PLEASE

Editor:

The *Spanish One* software reviewer in April *Rainbow* gets an "F" in Spanish.

In Spanish, they *do* use "yo," a nominative pronoun as an object of a preposition, e.g., "entre usted y yo."

The reviewer translates "Buenos Dias" as "Hello." Maybe so, but in actual use it is used only in the morning before noon. Does she think we only read *Rainbow* in the morning? You might say "Good Morning" in a morning newspaper, but not in a monthly magazine.

"Programa" doesn't end in an "e." It's an exception to the rules. It's a masculine noun from Greek, not Latin, and ends in an "a."

The reviewer should learn this sentence: "Los que viven en casas de vidrio, no deben tirar piedras."

Literal translation: "Those who live in houses of glass, should not throw rocks."

Conrad Kirksey
Houston, TX

HINTS 'N' TIPS

Editor:

In the April issue, a letter from Max Shank indicated that he was unable to run the *UNIDATFL* program (June, 1982 issue) in the upper 64K section using my program (January, 1983 issue) for relocating BASIC

programs to the upper 64K section of RAM, thus allowing for more data to be stored for the program.

In order for *UNIDATFL* to work in the upper 64K section of RAM, you have to delete step 1 which has a "GOTO 4000" statement. Steps 4000 and 4010 contain a subroutine for relocating *UNIDATFL* starting at &H0E18 and since you want the program to remain in the upper section of RAM, this subroutine must be avoided by deleting step 1 of the program.

The above correction will allow you to increase the number of records to be stored. Therefore, line 60 of *UNIDATFL* could be changed to read: "CLEAR 25000: D=500: DIM N\$(D)."

Jorge Mir
New Berlin, WI

Editor:

I want to thank Roger Schrag for his two patches to *EDTASM+*. That in itself more than paid for my subscription to *the Rainbow*.

I would like to offer a short patch to his that will print the disk directory when a L or W command is entered. I found myself forgetting the files I had on the disk and this seems to have solved the problem.

Insert these lines after line 100 (FNAME PSHS U) of the original program.

```
PSHS DP,X,Y
CLRA
STA >$006F RESET SCREEN-
      PRINTER SWITCH
TFR A,DP CLEAR DP REGIS-
      TER
JSR $CBCF DIR ROM ROU-
      TINE
PULS DP,X,Y
```

Reassemble the program following the instructions in Roger Schrag's article.

Craig Levang
Anoka, MN

CHAIRMAN OF 'D' BOARD

Editor:

As author of the March article "64K Modification For 'D' Board," I have been overwhelmed with the response from your readers. Many express thanks for the modification described. Unfortunately, a few people have had problems getting the conversion to work. I've attempted to answer all questions as rapidly as possible (usually within one day). Some difficulties are to be expected with any article on hardware modifications.

Difficulties experienced fall into three general categories:

- 1) Using the described D-Board modification or 'E' or even 'F' series CoCo boards. The modification can work on these boards although not exactly as described.
- 2) Not making all the changes indicated. It simply won't work if all the wires are not connected or if the jumper blocks haven't been reconfigured.
- 3) Simply not understanding the article because of no familiarity with the CoCo or

electronics wiring. I think it's great that some of you tried, even without this knowledge. That's how progress is made. I'll certainly do what I can to help you out.

If you're having difficulty, by all means, write me at 113 Boone Road, 15085. Describe the problem as completely as you can. Include a sketch of the modifications you installed. Include a checklist showing that all steps described in the article were completed. Include a self addressed stamped envelope. If you are in a hurry, call me at (412) 373-3363 after 6 p.m. EST. Have your CoCo open in front of you when you call.

Brian H. Alsop
Trafford, PA

ABUNCHA BBS'S

Editor:

Dr. D's CoCo Corner is a new Bulletin Board Service for the Color Computer. I would very much appreciate it if you would publish my BBS number in your magazine, as I do subscribe, and recommend it to all my BBS users. This BBS runs 24 hours a day; we support upload and download. My BBS phone number is (904) 456-7195.

Gary Dunsford, Sysop
Pensacola, FL

Editor:

Tom Mix Software is pleased to announce that we are now running a 24 hour bulletin board. The board is a total dedication to the Color Computer and will carry programs for downloading for the Color Computer.

We, like most boards, are looking for good public domain programs that will be uploaded to the system.

Our 24 hour BBS number is (616) 364-8217.

Tom Mix Software
Grand Rapids, MI

Editor:

I have set up a CoCo BBS in Morgantown, W.Va., called the Mountaineer Softline. It is open 24 hours a day, seven days a week. The phone number is (304) 599-0760. I would also like to compliment you on your fine magazine and I love how you have grown.

Wallace Colyer
Morgantown, WV

Editor:

I would like to use your excellent publication to inform everyone of a new Bulletin Board Service in Arlington, Mass. I am running the Color-80 (Silicon Rainbow products) BBS system on my 64K Color Computer. It is up 24 hours a day at 300 baud. The number is (617) 646-6809.

Also associated with this, I have formed a Color Computer user's group for the Boston area. Those wishing details can log onto the BBS or write to me directly at 3 Acton Street, 02174.

Greg Moore
Arlington, MA

KUDOS

Editor:

Has it really been two years? Who would believe that the little four page photocopy would turn into the finest magazine available for *any* computer. Just when I think I have finally gotten nearly all the way through an issue, the next one arrives, even better than the last!

Keep up the great work. I am proud to have played some small part in your fine efforts.

*Fred B. Scerbo, President
Illustrated Memory Banks
Williamstown, MA*

Editor:

I want to congratulate you on your new look. *Rainbow* is already a good magazine, but now it is also a very professional looking magazine. It seems right at home on the newsstand.

*Jack Gurner
Memphis, TN*

ORG! THAT'S CONFUSING

Editor:

I have been experiencing difficulties with Radio Shack's *EDTASM+* cartridge. When certain assembly language programs are entered into the editor, it seems to get the labels confused. On assembling the program, the editor returns a "Multiply Defined Symbol" error as it reaches every label. I have run into this problem several times, but only on three programs. Otherwise, *EDTASM+* works perfectly.

*Alan A. Farmer
Charlottesville, VA*

Editor's Note: The problem you are having is due to a double symbol table being accessed due to the location of your in-memory assembly. Try a different *ORG* statement.

CLUBS, CLUBS, CLUBS

Editor:

Those interested in activities of the Alaska Color Computer User's Group should write me at 816 N. Pine, #2, Anchorage, Alaska, 99504 or call (907) 274-5778.

*Rick McDannel
Anchorage, AK*

Editor:

I am interested in forming a Color Computer user's group in the Iowa City area. Interested people may contact me at R. R. #6, The Woods, Iowa City, Iowa, 52240.

I think you have a very fine and necessary publication, keep it running.

*S.P. Chapler
Iowa City, IA*

Editor:

I have received *the Rainbow* for several months now and each month just gets better and better. I am impressed with the quality and professionalism of your articles. In addition, on the one occasion when I had a

problem that I couldn't solve and called for help, your staff was both courteous and successful in helping me contact the person I needed to talk to. Your magazine is read from cover to cover each and every month both by myself and by my students at the school where I teach.

I would like to announce the formation of our user's group here in our area. We are called the Mil-O-Bar Color Computer Club. We anticipate a turnout of around 35 at our next meeting. We meet on the last Thursday of each month at Ona Junior High School. We welcome any and all who are interested. In addition, we would like to exchange ideas with other clubs on by-laws, newsletters, etc. Call me at (304) 743-4752 or Barry Huffstutler at 743-5356. Please call on Wednesday, Thursday or Friday.

*Jim Lemaster
Milton, WV*

Editor:

We are calling our user's group Ogden CoCo and *Rainbow* readers are welcome to exchange newsletters or otherwise contact us by writing to 4535 S. 2600 W., 84067.

*Kathy Rush
Roy, UT*

Editor:

The Color Computer Club of Sarasota meets the last Thursday of every month at 7:30 p.m. at 4047 Bee Ridge Road, Sarasota, Fla., 33582.

Interested CoCo and TDP-100 users are welcome to attend or to contact me at (813) 921-7510.

*Ernie Bontrager
Sarasota, FL*

Editor:

I am pleased to announce the organization of a Color Computer Club in the greater Birmingham area. Anyone interested should write me at P.O. Box 335, Gardendale, Ala., 35071, or call (205) 631-3320 or 798-2355.

I would also like to compliment you on the continuing excellence of your magazine.

*Joseph Bell, Jr.
Gardendale, AL*

Editor:

I recently purchased a Signalman modem for my CoCo. I also purchased the Colorcom/E software cartridge to accompany the modem. My only problem is that the modem has a DB-25 male connector and my CoCo has a 4 pin serial I/O socket. The man I bought the modem from said, "You have to buy an adapter to use it on your computer." So I called everywhere I could think of and everybody said that they never heard of that kind of adapter. Can anybody help me find one?

I also would like to try to start a CoCo user's club in the Linden/Rahway area. Anyone interested please contact me at 73 B Wavecrest Avenue, 07036, or call (201) 925-1827.

*Bud Lavin
Winfield, NJ*

Editor:

We are pleased to announce the Metropolitan Greenville Color Computer Club formed in January of this year and already almost 50 members strong.

The MGCCC serves the interests of present and prospective CoCo owners in the entire western South Carolina region. As a group, we are totally committed to computer literacy among ourselves and within the community. Members enjoy a lively exchange of computing information, free language, programming and hardware tutorials as well as a biweekly club newsletter.

Meetings are held every Tuesday at 7:30 p.m. in the Plain Elementary School, Simpsonville, S.C.

Anyone wanting more information about this dynamic organization may contact me at any time at (803) 876-3928 or -3812, or write.

*Ed Lowe
Gray Court, SC*

Editor:

Any CoCo owners in the Bloomington-Normal, Ill., area, interested in starting a user's group, SIG, etc., please contact me at 184 Southgate Estates, Bloomington, Ill., or phone (309) 828-4671.

*Ray Myers
Bloomington, IL*

Editor:

I would like to announce the formation of a TRS-80 Computer Club in southwest Oklahoma. As of this writing, we have 32 members. Anyone needing additional information can call me at (405) 355-7254, or the Secretary of the group, Cebe Mayse, at (405) 536-1907. We are currently calling ourselves S.L.U.G. (Southern Lawton Users Group).

*Dan Goddard
Geronimo, OK*

Editor:

Those in the Louisville and southern Indiana area who would like to get a Color Computer Club started should contact me at 2603 Garden Lake Lane, 40220, or call (502) 491-1853.

*Roger Idstrom
Louisville, KY*

Editor's Note: Roger, read on.

Editor:

We are forming a Color Computer group in the Louisville area, and would like very much to hear from anyone interested in joining us. For more information, contact me at 2820 Del Rio Place #27, 40220.

*Stephen Hess
Louisville, KY*

Editor:

I am interested in forming a CoCo Club in the Kannapolis/Concord/Salisbury area in North Carolina. All CoCo owners interested please contact me at 2419 Lane St., 28081 or call (704) 932-6653.

*Mike Mundy
Kannapolis, NC*

COLORSOFT™ BUSINESS SOFTWARE

AT LAST! BUSINESS SOFTWARE DESIGNED FOR THE COLOR COMPUTER

- ★ MAKE YOUR COLOR COMPUTER A WORKING BUSINESS PARTNER ★
- ★ ALL PROGRAMS ARE MENU DRIVEN AND USER FRIENDLY ★
- ★ PROFESSIONALLY WRITTEN AND FULLY TESTED ★
- ★ AFTER-THE-SALE SUPPORT ★

COLORSOFT™ GENERAL LEDGER

COLORSOFT™ General Ledger is ideal for the small business man who wants to take advantage of the time saving benefits of computerized accounting procedures. This package is designed for the businessman who is knowledgeable of accounting principles and who wants a computerized accounting system with greater user control. The features and options of this package compare favorably to higher priced software.

FEATURES

- *** USER FRIENDLY AND FULLY MENU DRIVEN ***
- *** UP TO 96 USER DEFINABLE RECORD CATEGORIES ***
- *** USER FLEXIBILITY IN ACCOUNT DESIGN AND ENTRIES ***
- *** DETAILED USER'S MANUAL WITH SAMPLE TRANSACTIONS ***
- *** APPROXIMATELY 800 ACCOUNTS RECEIVABLE/PAYABLE FILES ***
- *** STYLED FOR THE ACCOUNTANT/BOOKKEEPING ORIENTED USER ***
- *** MENU PROMPTS MAKE ENTRIES EASY, FAST, AND EFFICIENT ***

COLORSOFT™ General Ledger is an integrated, journal-type double entry accounting package for a small business that includes General Ledger, Accounts Payable, and Accounts Receivable programs. Outputs of the system include an income statement, balance sheet, accounts payable and receivable status lists, accounts payable and receivable aging reports, journal reports, account listing and a closing summary. During each user established accounting period (monthly, quarterly, annually, etc.), it will handle accounts of up to \$1,000,000.00 for approximately 800 accounts payable/receivable. Accounts are automatically numbered and each transaction is carried separately so that an account number will correspond to a specific purchase rather than a specific vendor/customer.

Requires 16K and a Single Disk Drive.
PRICE: \$129.95

COLORSOFT™ SMALL BUSINESS ACCOUNTING

The COLORSOFT™ Small Business Accounting package is ideal for the small businessman who wants to take advantage of the time saving benefits of computerized accounting procedures. This package is designed with this person in mind and as such, extensive computer or accounting experience is not required. The features and options of this package are comparable to much higher priced software.

FEATURES

- *** USER FRIENDLY AND FULLY MENU DRIVEN ***
- *** USER DOES NOT NEED TO BE AN ACCOUNTANT ***
- *** UP TO 32 USER DEFINABLE RECORD CATEGORIES ***
- *** DETAILED USER'S MANUAL WITH SAMPLE TRANSACTIONS ***
- *** USER IS PROMPTED FOR COMPANION ENTRIES AS REQUIRED ***
- *** APPROXIMATELY 800 ACCOUNTS RECEIVABLE/PAYABLE FILES ***
- *** MENU PROMPTS MAKE ENTRIES EASY, FAST, AND EFFICIENT ***

COLORSOFT™ Small Business Accounting is an integrated, ledgerless accounting package for a small business that includes Accounts Payable, Accounts Receivable, Sales, and Purchase Order programs. Outputs of the system include an income statement, balance sheet, check register, accounts payable and receivable status lists, and accounts payable and receivable aging reports. During each user established accounting period (monthly, quarterly, annually, etc.), it will handle sales of up to \$1,000,000.00 and approximately 800 accounts payable/receivable. Accounts are automatically numbered and each transaction is carried separately such that an account number will correspond to a specific purchase rather than a specific vendor/customer.

Requires 16K and a Single Disk Drive.
PRICE: \$149.95

COLORSOFT™ MANAGEMENT SKILLS SERIES I: BEING BOSS

"BEING BOSS" is a collection of six programs and is the first in an ongoing series of computer assisted management development tools. Those who can benefit include corporate executives, managers, heads of teams, group leaders, supervisors, foremen, teachers, and parents. In fact, anyone who must take a leadership role can benefit from these programs.

- A. REFLECTIONS - a self evaluation guide
- B. ASSERTIVENESS - taking control as a leader
- C. MANAGEMENT STYLES - how to approach the leadership role
- D. DECISION MAKING - how to handle decision making
- E. COUNSELING - helping others solve personal problems
- F. STRESS CONTROL - taking care of yourself

Each program is in a multiple choice questionnaire format where the user is queried as to a response to a specified management situation. Tutorials help the user learn new management skills and insights. The programs include voice annotation from the author, Mr. Terry Barker. "BEING BOSS" is based in part on his forthcoming management books "BOSS TALK" and "THEORY C."

The series, "BEING BOSS", offers to the user the latest in management skill development concepts and should prove to be an invaluable TOOL for anyone who wishes to reach their full potential as a leader. The author has condensed week long intensive workshop material into this outstanding package. The accompanying user's manual is very well written and is easily understood by anyone.

Requires 16K and cassette.
PRICE \$89.95

COLORSOFT™ ACCOUNTS RECEIVABLE

COLORSOFT™ Accounts Receivable is a full stand-alone accounts receivable system. It is also suited for integration into the COLORSOFT™ Small Business Accounting package. Accounts Receivable does not require the user to be an accountant; in fact, this is a highly user friendly system designed for daily use by the small businessman. The features and options of this system compare favorably with much higher priced software.

FEATURES

- *** PROVIDES ACCOUNT AUDIT TRAIL ***
- *** ACCOUNTS ARE CARRIED BY CUSTOMER ***
- *** USER FRIENDLY AND FULLY MENU DRIVEN ***
- *** PREPARES INVOICES AND MAILING LABELS ***
- *** USER DOES NOT NEED TO BE AN ACCOUNTANT ***
- *** DETAILED USER'S MANUAL WITH SAMPLE TRANSACTIONS ***
- *** MENU PROMPTS MAKE ENTRIES EASY, FAST, AND EFFICIENT ***

COLORSOFT™ Accounts Receivable provides the user with detailed audit trails and history files on all transactions by a customer. It also prepares invoices, mailing labels, aging lists, customer history reports, and an alphabetized customer listing. The user can define discount/net terms for commercial accounts and finance charge and minimum payments for revolving accounts.

Requires 16K and a Single Disk Drive.
PRICE: \$89.95

USER'S MANUALS WITHOUT PROGRAM \$20.00 EACH (Refunded on Purchase)

INCLUDE: \$2.25 Handling Per Order

WRITE FOR FREE CATALOG

BRANTEX, INC.

COLOR SOFTWARE SERVICES DIV.

BUSINESS SOFTWARE GROUP
P.O. BOX 1708, DEPT. R
GREENVILLE, TEXAS 75401



TELEPHONE ORDERS
(214) 454-3674
COD/VISA/MASTERCARD

ATTENTION DEALERS: WE OFFER THE BEST DEALER PLANS AVAILABLE

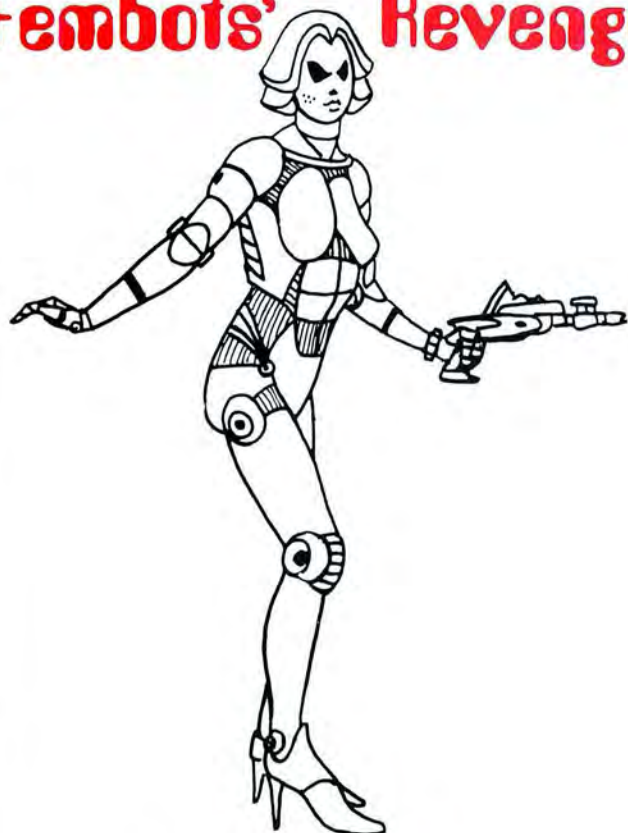
ColorQuest™

GAMES

For The TRS-80 Color
and TDP System 100

Fast Machine Code • Hi-res Color Graphics • Exciting Arcade Action and Sound

Fembots' Revenge™



3-D GRAPHIC ADVENTURE

Make love not war? Not with these sultry FEMBOTS! What a tale you'll tell IF you live to tell it! Cold steel never felt so HOT! The color and excitement of ARCADE ACTION combined with the sophistication, intellectual challenge and skill of an ADVENTURE GAME doesn't fully describe this cosmic shoot'em up.

16K Tape \$29.95

32K Disk \$34.95

BEYOND THE CIMEEON MOON™



by Kevin Herrboldt & Tim Nelson

3-D GRAPHIC ADVENTURE

A dead star . . . A derelict vessel . . . or is it? Trapped within you must venture the corridors; defend yourself against the merciless gauntlet of agents of the machine mind. A real-time, high-res, 3-D science fiction adventure game of mind-blowing magnitude.

16K Tape \$24.95

32K Disk \$29.95

Adventure Trilogy™



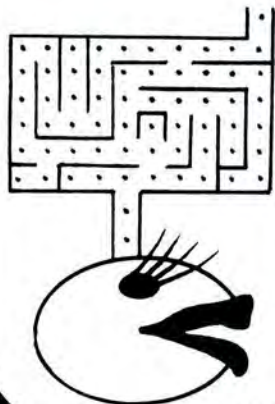
by Kevin Herrboldt & Tim Nelson

3-D GRAPHIC ADVENTURE

Clash steel with thy foe in the arena of gore. Proved worthy, go in quest of the elusive Eye of Dazmor. If ye findest the orb, hast ye the might to ward off skem and the fortitude to restore the Eye? The ultimate high-res, 3-D quest for even the most experienced adventurer!

16K Tape \$24.95

32K Disk \$29.95



MS. NIBBLER™

by Tom Czarnecki

The ONLY Ms. game around. A must for your PAC-like game collection.

16K Tape \$19.95

16K Disk \$24.95

For Orders
ONLY Call
Toll Free

1-800-328-2737

Fast Machine Code • Hi-res Color Graphics • Exciting Arcade Action and Sound

INTERCEPTOR™

by Scott Snyder

Goes beyond "DEFENDER" and "STARGATE" to offer the most realistic ARCADE simulation possible. Warp speed action, multi-colored terrain and long-range viewer make this game tops.

16K Tape \$19.95
32K Disk \$24.95



VEGAS GAMEPAK™

by Dan Nelson

Why fly to VEGAS when you can have a casino at home! The VEGAS GAMEPAK is five action packed games with great graphics & sound. SLOT MACHINE - BLACKJACK - UP AND DOWN THE RIVER - CRAPS & KENO.

16K Tape \$19.95 16K Disk \$24.95

THE NIBBLER™



by Tom Czarnecki

Fast paced maze chase game will entertain the entire family.

16K Tape \$19.95
16K Disk \$24.95

ColorQuest™

A Division of Softlaw Corp. 612/881-2777
9072 Lyndale Ave. So., Minneapolis, MN 55420

AUTHORS' SUBMISSIONS ARE ENCOURAGED

Available at Dealers everywhere.

If your Dealer is out of stock ORDER DIRECT!



KOMET-KAZE™

by Tom Czarnecki

Shades of smartbombs and hurtling comets! Defending your planet from invasion was never so challenging. Disruptor fire is your main defense against the fierce alien attacks.

16K Tape \$19.95

32K Disk \$24.95

ORDERING



Customer service and product support call (612) 881-2777
Make checks or money orders payable to Nelson Software Systems. Personal checks allow 3 weeks.
MAIL ORDERS: \$2.00 U.S. Shipping (\$4.00 CANADA \$10 OVERSEAS) Add \$2.00 for C.O.D.
ORDERS SHIPPED SAME DAY!

TDP SYSTEM 100* / QUALITY DISCOUNT PRODUCTS / COLOR COMPUTER*
DISCOUNT PRICES / COMPARE / WE'RE FAST / ORDERS SHIPPED WITHIN 24 HR.

Software Specials 20% OFF

PRICKLY-PEAR SOFTWARE

Astrology	34.95	27.95
Fantasy Games (32K)	24.95	19.95

PETROCCI FREELANCE

Inspector CLUEseau	17.95	14.35
Stress	17.95	14.35
Weather Watch	17.95	14.35

TOM MIX SOFTWARE

Space Shuttle (32K)	28.95	23.95
Trap Full	27.95	22.95

SOFT SECTOR MARKETING

Color Caterpillar	19.95	15.95
Master Control II	19.95	15.95

B-5 SOFTWARE

Clock	24.95	19.95
Money	19.95	15.95
Math Fact	16.95	13.95
ABC's	9.95	7.95

PRICKLY-PEAR SOFTWARE 15% OFF ALL LIST

Viking*	19.95	16.95	Great Word Game*	19.95	16.95
Gangbuster	19.95	16.95	Household Helper	19.95	16.95
Football	19.95	16.95	Math Pack 1	19.95	16.95
1 Ching	19.95	16.95	Pre-Read	24.95	21.95*
Numerology	19.95	16.95	Song Book (w/tapes)	29.95	25.95
Tarot	19.95	16.95	Fantasy Games Pk	19.95	16.95
Trilogy (1 Ching, Numerology, Tarot)	39.95	33.95	Las Vegas Weekend	24.95	21.95
Phonics 1	24.95	21.95	Phonics II	24.95	21.95
			8-Bit Bartender	19.95	16.95



RADIO SHACK

64K Ext. Mod.	375.00
16K Ext.	279.00
Drive O	449.00
9 1/2" Tractor (3000 sh)	24.95
9 1/2" Tractor (500 sh)	5.95
Computer Cassettes	.99
Assorted ROM pkg.	10% Off
MD Keyboard	59.95

TOM MIX

King	(32 K)	24.95	22.95
Katerpillar	(32 K)	24.95	22.95
Protector	(32 K)	24.95	22.95

MARK DATA

Astro Blast	24.95	22.95
Space Rider	24.95	22.95

Aardvark Products

Haunted House	9.95
Killer Bot	13.95
Labyrinth	14.95
Starship Herc.	14.95
Time Trek	14.95
Escape from Mars	14.95
Pyramid	14.95
Quest	14.95
Trek Adventure	14.95
Circle World	14.95
Nuclear Sub	14.95
Venture	19.95
Tiny Compiler	24.95
Tube Frenzy	19.95
Derelect	14.95
Caterpillar	19.95
Space Battler	12.95
Golf	9.95
Catchem	19.95

Spectrul Associates

Cosmic Invaders	21.95	19.75
Meteorites	21.95	19.75
Space Wars	21.95	19.75
Ghost Gobbler	21.95	19.75
Robot Attack	21.95	19.75
Galax Attack	21.95	19.75

Computer Island

Circus	10.00
School Maze	10.00
Name That Song (I, II, III)	ea. 10.00
Silly Sentences	6.00
Silly Stories	6.00
Poetry	6.00
Wizard	6.00
Apartment House	6.00
Mystery	

Sugar Software

Silly Syntax	19.95
Additional S.S. Tapes	9.95
Fairy Tales	
Sing Along	
X-Rated	
Current Events	
Adventure	
Potpourri	
Auto Run	14.95
TIMS (32K)	24.95

Eigen Systems

Basic Aid (cart.)	34.95
Stripper	7.95
Ccead	6.95

Cognitec

Telewriter 64	59.95	54.95
---------------	-------	-------

Terms: Cash, money order, your personal checks welcome. No waiting to clear on software items. Shipping and C.O.D. please add \$2.50, hardware add 5% extra for packing. All programs are 16K except where noted. We're open for phone orders from 12:00 noon until 9:00 p.m., 7 days a week. Send for our free catalog listings. We accept all foreign orders in U.S. funds only.

Warranty: All hardware products are warranted for a period of 180 days from date of purchase. We shall not be liable for loss or damage, alleged or caused indirectly to hardware or software including interruption of service, business loss, loss of expected profits or any damage resulting from use of hardware or software. *Trademark of Tandy Corp.

Desert Software, P.O. Box 502, Cortaro, AZ 85230
Call (602) 744-1252 for immediate C.O.D.

Print #-2,

What a fitting way to lead into the beginning of *the Rainbow's* third year and this Second Anniversary Issue!

What I am speaking about, of course, is RAINBOWfest, which we held in Chicago in late April and on which you will see a report—in both words and pictures—in this issue. To quote one of the people who attended, it was a “smashing success.” The booths were full, the aisles were even fuller (yes, there will be more space next time) and a good, great and wonderful time was had by just about everyone! You’ve seen me write often about CoCo Community. Well, RAINBOWfest was CoCo Community at its finest. There were thousands and thousands of people there—and what they spoke about for three days running was CoCo. I can tell you, after all the years of proclaiming time and again that CoCo isn’t a toy, of beating down rumors (published by some magazines and otherwise) that CoCo was dead, of hearing praises about this computer system and that—RAINBOWfest, and all the people there who truly know the power, capability and have the sincere *love* for their CoCos was, indeed, one of the best moments in my life.

We anticipated a couple thousand people would attend RAINBOWfest and, from that point of view, figured it would be a success. In all, total attendance was somewhere between 10,000 and 11,000. Our seminars were standing room only, the breakfast with Don Inman was a complete sellout. In all it was far, far above any expectations. A veteran show-goer told me he had never seen anything like it in his life! Me either.



I am as proud as can be that we were able to put on RAINBOWfest! And, for the record, I want to say that we will have another one—maybe more than one. Virtually every exhibitor was asking to be able to participate again. And there were a large number of people there who didn’t exhibit who plan to be there next time.

I couldn’t talk about RAINBOWfest without saying how much all of us owe to Dave Hooper, the local arrangements chairman. Dave truly did it all—and in totally outstanding fashion. There are thousands of people, Dave, who thank you for everything you did to make the show what it was.

There should be praise, too, for Don Inman, our breakfast speaker, who did a marvelous job, and for all our seminar speakers. They included Fred Scerbo of IMB, Tom Nelson of Nelson Software, E. R. Bailey of Micrologic, Dr. Hal Snyder of the Northern Illinois CoCo Club, Steve Bjork, the author of *Zaxxon*, and Charles Roslund of Elite Software. By the way, Charles is back in *the Rainbow* with his popular *Charlie's Machine* feature.

And the “gang” from here: General Manager Pat Hirsch; Ad Manager Patty King, who was also responsible for putting things together from this end; Art Director Sally Nichols, Research Assistant Monica Wheat; Managing Editor (and truck driver) Jim Reed; and our “volunteer,” Willo Falk, my better half. Too, a very special thanks to Ted Donhauser of ProMar in Chicago. He came to the rescue time and again.

RAINBOWfest brought people from all over—from Great Britain, from Germany, from the Yukon, Hawaii and all across the United States and Canada. It certainly seemed every state was represented. It was a fantastic time and I hope you will make plans to share some fine CoCo Community with us in the future.

So, now, it’s Second Anniversary time. I hope you like this anniversary issue, as *the Rainbow* enters its third year. Our big surprise is included, too—the soundsheet that is bound in every issue. We encourage you to try it out; there are some good programs on it! And, then, we would really like to know whether you like this innovation. If you do, we may consider doing it again—or even on a

(continued on page 272)

**BETTER
SOFTWARE COMPANY**
P.O. Box 16842 — Sta. B
Greenville, South Carolina 29606
(803) 233-2700

PRESENTS



COLOR-STICK

The ORIGINAL interface for
the TRS-80*
Color Computer to let
you use the famous:

ATARI* JOYSTICK*

Just plug your Atari or Atari like joystick (the Color-Stick enables the use of most joysticks made for the Atari) into the Color-Stick interface and then plug the Color-Stick into an empty joystick port.

The Color-Stick can improve scores 50% and more while making some games more exciting and fun to play.

Don’t settle for cheap imitations. Only the ORIGINAL Color-Stick’s small inline design allows you to just plug your joystick into it and forget it. The Color-Stick becomes a part of your joystick so it does not interfere with your game playing. In addition Color-Stick returns a full value of ‘63’ for the right and down directions, even when using two joysticks and even in the diagonal directions, the others don’t.

NOW Color-Stick has a new low price.....

Color-Stick interface \$12.95 each

two for \$22.95 (less joysticks)

Atari joysticks \$9.95 each

**BETTER
SOFTWARE COMPANY**
P.O. Box 16842 — Sta. B
Greenville, South Carolina 29606
(803) 233-2700

Don’t miss out order the ORIGINAL. Send your check or money order or better yet call today and order your Color-Stick.



Add \$2.00 per order shipping and handling. Bank cards welcomed (please include expiration date). Orders paid by cashiers check, money orders, bank cards and C.O.D. are shipped within 48 hours. Personal checks please allow 1-2 weeks. C.O.D. orders add \$1.50 extra. S.C. residents add 4% sales tax. *TRS-80 is a registered trademark of Tandy Corp. Atari is a registered trademark of Atari, Inc.

BUILDING JULY'S RAINBOW

The Second Anniversary issue . . .

Leaping over the 300-page hurdle . . .

Introducing the Rainbow Soundsheet . . .

Partytime at *the Rainbow*! It's our second birthday. There's been a bit of reverie around here about breaking the 300-page mark and, in a moment of reflection, we made the observation that this month's issue of *the Rainbow* has more pages, by eight, than the entire first year's editions combined. To put it another way, the very first issue of the *Rainbow* took up both sides of a total of 50 sheets of paper; this month's magazine will use more than two 35-ton box-car loads of paper. While we grew up in a hurry, we hope to grow old gracefully with our birthday resolution being to emphasize quality, not size.

Size does have its advantages, though. Thanks to the support of all of you and our 203 advertisers, we're able to offer everyone a birthday gift that we're really quite proud of, our *Rainbow* Soundsheet sampling of programs from our birthday issue. If you haven't already, do give it a spin.

Another birthday special is "Two Years of *Rainbow*," a complete index — by subject and by author as well — of all the articles, programs, reviews and special features appearing in *the Rainbow* between July 1981 and June 1983. Many

of you have been asking for this reference piece, and we plan to make it an annual anniversary feature.

Another index, of sorts, and what we hope will become an active, evolving reference work, is Bob Russell's Color Memory Map. This valuable compilation of "hooks" and "addresses" is being presented in installments over the next few months. Even if you aren't among those who are excited to get this otherwise unavailable information, do hang onto it because, as you continue to learn more about BASIC, you'll develop a need for and appreciation of it.

Among our many happy returns in this anniversary special are Charles J. Roslund, who's back with his popular *Charlie's Machine* and Fred Scerbo, who returns to our pages with *Snail's Revenge*, the long-awaited sequel to his *Snail Invaders* (February 1982).

Moving right along, from snails to turtles, new this issue is *Greetings From Uncle Bert*, with Dale Peterson, our new column on LOGO, directed to kids and parents, too.

Also new this issue is the TRS-80 MC-10 Micro Color Computer! Editor Lonnie Falk provides a preview of this 4K

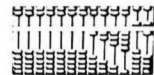
"Coquette?" in our Pipeline column.

And, speaking of our founder/editor/-guiding light/driving force, since this is a festive occasion for *the Rainbow*, and even though the big get-together and celebration took place at RAINBOWfest, I want to take this opportunity to salute the boss. In speaking of Lonnie Falk during his after-breakfast address at RAINBOWfest, Don Inman spoke of a man "with stars in his eyes and visions of rainbows in his mind," and that's very true of Lonnie. Later in his talk, Don said he likes to think of himself as, not an expert, but a "beginner in each field and (I) plan to stay that way forever." He was also describing Lonnie Falk, whose creative spirit is kindled by an almost childlike fascination for the new, the different, the unexplored. Nobody is happier than Lonnie Falk when he has a newly-delivered box to open and still another set of instructions to read. If Lonnie ever found the rainbow's end, he wouldn't linger at all, but would immediately begin looking for another rainbow. Without getting too soupy, Lonnie, keep on chasing rainbows, the chase is all the fun.

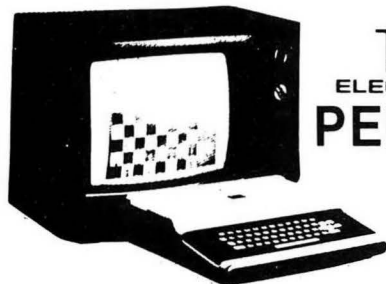
—Jim Reed

ALMOST UNBELIEVABLE!

ABACUS COMPUTER DISTRIBUTORS



wholesale distributors of *tandy*™ computer systems



TDP
ELECTRONICS **SYSTEM 100**
PERSONAL COMPUTER
64K EXTENDED COLOR
\$389⁰⁰

(Delivered Anywhere in the USA)

Everything You Need From Software To Hardware

DEALER INQUIRIES INVITED

Call or Write for Details on Programs and Discount Pricing

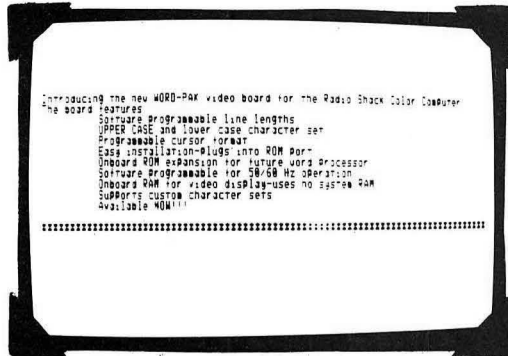


16012 South Cottage Grove Ave, South Holland, IL 60473

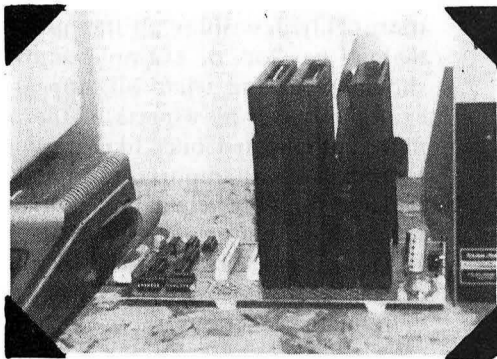
Division of Union Electronics, Inc.

312-339-2777

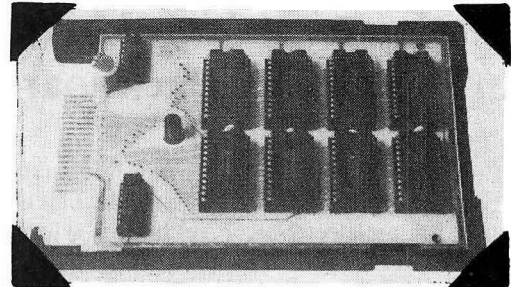
CoCo ALBUM



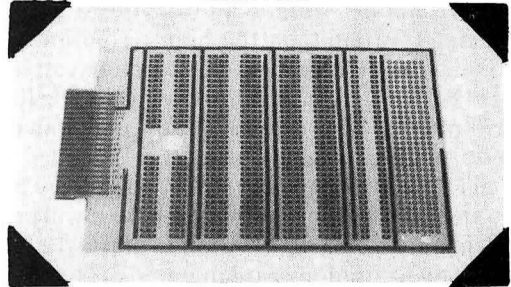
**WORD-PAK
DISPLAY**



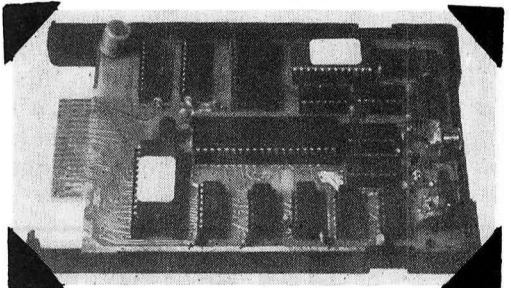
C-C BUS INSTALLED



MEM-PAK



PROTO - CoCo



WORD-PAK

WORD-PAK

80 column video board for the Radio Shack Color Computer. No longer do you have to sacrifice valuable memory and strained eyesight to expand the video display of your computer. The board features:

- Full ASCII character set (also supports custom character sets for user specific applications)
- Programmable line lengths and cursor formats
- On-board ROM expansion for future word processor
- 50/60Hz operation
- Easy installation-plugs into ROM port
- Available for cassette or disk based systems (disk systems require the use of a 'Y' connector or expansion bus)
- Contains it's own video RAM-requires no system RAM

The WORD-PAK produces a composite video signal and requires the use of a monitor capable of displaying 80 columns of text.

Think of the applications!!

Price: \$169.95

MEM-PAK

16K RAM/ROM expansion board. Expand RAM (for unmodified Rev. E and older computers) or put your programs/utilities in ROM for instant loading. Utilizes 24 pin, compatible RAM/ROM/EPROM memory devices.

Price: \$114.00 (with 16K RAM)

P-C PAK

Parallel printer port and real time clock. Free up your serial port by adding this Centronics compatible parallel port to your computer. The board also features a real-time clock with battery back-up capability (optional).

Price: \$122.95

C-C BUS

A fully buffered, six slot expansion bus for your CoCo. Each slot is software selectable, allowing up to six cartridges/accessory boards to be installed simultaneously with no contention problems. The bus also supports boards designed to use the high memory (HFF60-FFBF) area as I/O. Simply connect the C-C BUS to the ROM port** and you can expand memory (up to 128K for Rev E and older computers that can 'write' to the ROM port), add a parallel port, EPROM programmer, voice synthesizer.... you name it, and software select the one you want to use without having to turn the computer off to change cartridges.

Think of the potential!!

Price: \$125.00

Option 1. Power supply \$24.95

The C-C BUS can use either the computers power supply (this will limit the number of devices you can install on the bus) or an on-board power supply.

Option 2. Molded plastic cover \$Call

** Requires S-cable (below)

PROTO-CoCo

Prototyping board with all the features.

- 20 sq. inches of prototyping area
- All signals identified on board
- Designed to fit inside a disk controller case. Gives your finished prototype a professional look.
- allows either point-to-point wiring or wire-wrap.

Price: \$14.95

ACCESSORIES

Y-cable \$29.95

S-cable \$19.95

SPECIAL:

BMC Model 12A Monitor
ONLY \$89.00 with purchase of a Word-Pak.

MAIL ORDERS:

Send check, money order, MASTERCARD/VISA (include card number, interbank number, expiration date and signature) for total purchase price, plus \$2.50 for shipping and handling (Canadian orders please add \$5.00). New Jersey residents add applicable sales tax.

PJ inc.

P.O. BOX 813
N. Bergen, N.J. 07047
(201) 330-1898

Color Computer is a Trademark of Radio Shack
a Division of Tandy Corp.

Function Graphing Module

An Electronic Blackboard

I teach mathematics and I have often felt sorry for my students because of my poor drawings on the blackboard. I have wished for an electronic blackboard, which would graph functions at the press of a button. At last, my wish has come true, with *Function Graphing Module* from Calcsoft.

Function Graphing Module allows you to graph functions of a single variable on the high resolution graphics screen of your Color Computer. Any function you can write in Extended BASIC, including those using the trig functions and logarithms, can be accurately graphed and analyzed.

You enter the functions by using the Extended BASIC Editor to place the function definitions in specified program lines. You then start the program and have a wide range of options. Probably, you will first want to graph the function. The easiest way to use the graphing mode is to choose the range of x-values you want graphed, and allow the program to "auto-scale;" that is, to automatically choose the x- and y-scales, the placement of the origin, and so forth. The function will then be displayed according to these auto-scales values. Once you see how the graph looks with these values, it's easy to change any of them to graph the function just the way you want. In addition to choosing the graphing

parameters, you can mark any x-values you want on the graph with a vertical bar.

In the multiple graphing mode, you can graph up to four functions on the screen at once. You have a choice of graphing them on the same set of axes, or on different axes. This is really very useful for solving many kinds of mathematical problems—for example, to graph a piecewise continuous function.

The remaining two modes are the Value Mode and the Zero Mode. In the Value Mode, the program will find the value of the function for any x-value you specify. In the Zero Mode, the program finds a root of the function; that is, an x-value for which the function equals zero. You input two x-values, one where the function is positive, and one where it's negative. (Graphing the function first makes it easy to find such x-values.) As long as the function is continuous, a root will lie between the two x-values. The program then uses the bisection method, also known as the binary chop, to find the root to within a tolerance you select.

The documentation that comes with the program is superb! There are over 50 pages of documentation, along with a one-page "Handy Reference Guide." In addition to thoroughly describing all the options of the program, the manual has lots of examples showing exactly what you should type, and what will appear on the screen. These examples cover all aspects of the program, including the more complicated ones like graphing multiple functions. Examples are an important tool in learning, and the examples here are a big help in understanding how to get the most out of this program.

An unusual feature of the manual is the chapter titled "Crash!" Since you provide part of the program in the lines defining the functions, there's a chance you'll have a syntax error in a function definition, or a function that will require a division by zero, or some other illegal operation. The manual explains this thoroughly, and helps you avoid crashes by giving numerous examples showing correct syntax. If you crash the program anyhow, the manual gives instructions on how to recover.

One suggestion for improving the manual: a table of contents and page numbers would help.

Function Graphing Module performs flawlessly, and clearly has been designed with the user in mind. The functions have been well-chosen, and the documentation is excellent. This is an outstanding product.

(Calcsoft, P.O. Box 401, St. Ann, MO 63074, 16K ECB, \$19.95)

—David Finkel

FRUSTRATED
WITH FOLD-OUTS?

MADDENED BY
MANUALS?

DON'T CURSE
YOUR CURSOR!

SEND FOR

HELP!

THE VERY BEST COLOR COMPUTER REFERENCE SYSTEM

HELP! provides the BEGINNING PROGRAMMER with every basic command for the COLOR COMPUTER.

Each command is indexed by what it **does** as well as what it is called. Every major command is shown with its formula, examples of how it is used, a full set of notes, common pitfalls, and references to the instruction manual.

HELP! provides the more ADVANCED PROGRAMMER with the perfect reference system for checking less familiar commands. It can also serve as a translation of Basic into Color Basic.

232 pages, ring-bound, lies flat on computer.

REAL SOFTWARE

P.O. BOX 486 NORTHBORO, MA 01532
PHONE: (617) 393-6281

Please send HELP! Enclosed find \$9.95 plus \$1 shipping.

NAME _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

MASTER CARD OR VISA

CARD # _____ EXP. DATE _____

SIGNATURE _____

Massachusetts residents add 5% sales tax

R-1

Hint . . .

PCLEAR0 With a Disk Drive

While people insist that it is impossible to *PCLEAR0* on a disk system, I get that effect by using: *POKE 25,6: POKE 27,6: POKE 29,6: POKE 31,6*

Although you cannot use the disk drive until you again *PCLEAR 4*, it can be accomplished.

Steve Skrzytniarz
Tacoma, WA



KEYBOARDS

by Macrotron

The Premium Keyboard

All the features of our popular Professional Keyboard:

- * No gluing, soldering, or cutting—plugs right in
- * Four function keys complete the matrix
- * High quality construction assures years of trouble-free operation
- * Complete documentation included

PLUS these exciting new features:

- * Attractive low profile
- * Extended Radio Shack layout
- * Silk-smooth feel—uses ALPS keyswitches

Our Versakey software enhances the keyboard's utility

- * Auto-repeat, n-key rollover and type-ahead
- * F1 becomes DEFINE, F4 becomes CTRL
- * May define up to 128 keys (including their SHIFT, CTRL, and SHIFT-CTRL combinations) as strings of up to 80 characters each.

* Supplied on cassette, may be copied to disk

"Have Josie ship yours today!"

<i>The Premium Keyboard</i>	\$89.95
The Professional Keyboard.....	\$69.95
Versakey software.....	\$9.95

Both keyboards carry a 90-day limited warranty.

Please specify your computer's PC board type if known. Otherwise, specify the complete catalog number and serial number.

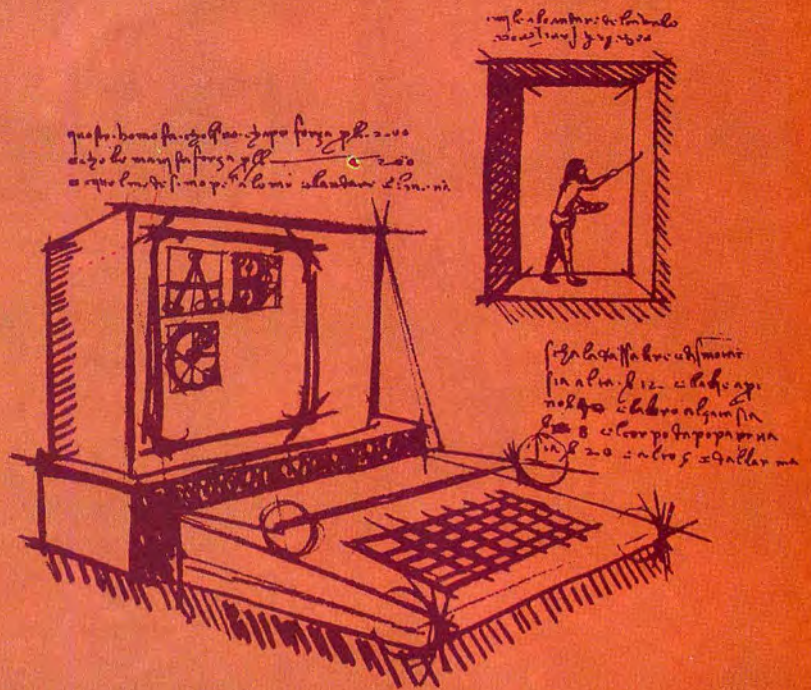
Micronix Systems Corporation

7 Gibraltar Square
 St. Charles, MO 63301
 (314) 441-1694

Terms: Prepaid check or money order, Mastercard or Visa.
 Shipping Charges: U.S. \$2.00, Canada \$5.00, COD \$3.50 (No COD's to Canada).

ROM CALLS

THE EASY WAY



By C. J. Roslund

When programming in machine language, there are many times when life would be much easier if you could let BASIC take care of something for you. A few examples that come to mind are:

- *Writing data files to cassette or disk
- *Doing real math calculations (ie, SIN, COS)
- *Drawing complex graphics

There are, of course, routines in the BASIC ROMs to do all of these, since they can be done from a BASIC program. Calling these ROM routines from your own machine language program has typically taken a lot of studying of the BASIC ROMs to discover exactly how to call the routine you need and also what parameters need to be initialized prior to calling the ROM routine. Another concern must always be if the entry point you use will be the same in all releases of the BASIC ROMs. I am going to present a method of making ROM calls I have developed that will allow you to call any ROM routine that has a BASIC command counterpart. For example: *PRINT*, *LINE*, *CIRCLE*, *OPEN*, *CLOSE*, *CLEAR*, etc. You will only need to know one ROM entry point (which I will give you) to call any of these routines.

The idea behind this method of making ROM calls is to trick the computer into thinking it is running a BASIC program in the middle of your machine language program. If you can do this, and point the BASIC interpreter to the BASIC command line of your choice, you can let the BASIC interpreter do all the work for you. You only need to create what looks like a BASIC command line in the middle of your program. For example: *PRINT*"IT WORKS." The first thing

BECOME AN INTREPID SPACE ADVENTURER...

AREX



by William Muk

CoCo version by Roger Schrag

Atari version by John Anderson

Far beyond the known galaxies, you venture deep into the vast reaches of outer space. But you are not alone! In a flash, without so much as a how-do-ya-do, they're in hot pursuit and you're left to do before you're done unto. **Can** you elude your pursuers? **Will** you elude your pursuers? And who **are** these guys anyway? Find the answers to these and other compelling questions in AREX. See your dealer today!

AREX ... Coin-op arcade realism at home for 1 to 2 players.

AREX		
CoCo 16K TAPE	060-0172	\$34.95
TRS-80 Model 1 & 3 16K TAPE	010-0172	\$34.95
TRS-80 Model 1 & 3 32K DISK	012-0172	\$34.95

...OR FLY HIGH IN THE WORLD OF HIGH FINANCE

by George Schwenk

TRS-80 version by Dave Simmons

CoCo version by Roger Schrag

"Yas, after purchasing diamond mines in South Africa, oil wells in Saudi, and rare beer cans in Walla Walla, Washington, I had begun to wonder what other trendy commodities remained to be added to my swelling portfolio. Then a snip of a ticket girl dared to tell me (ME, Hartley J. Wormsflather III!) that my flight was overbooked. To avoid future misunderstandings, I bought the airline."

"I think I'm on to something profitable here."
Hartley J. Wormsflather III

AIRLINE ... A no-holds-barred strategy game for 1 to 4 players.

AIRLINE
ATARI 400 & 800 / CoCo / Model 1 & 3 16K TAPE . . . 140-0169 \$24.95

Published by



a subsidiary of Scott Adams, Inc.
BOX 3435 • LONGWOOD, FL 32750 • (305) 862-6917
Prices Subject To Change Without Notice

AIRLINE



To order, see your local dealer. If he does not have the program, then call 1-800-327-7172 (orders only please) or write for our free catalog. DEALER INQUIRIES ARE INVITED!

you must know is how BASIC "Tokenizes" all key words. Key words, such as *PRINT*, *OPEN*, *LINE*, etc. are stored in memory as a one byte token. This conserves memory, and speeds execution of a BASIC program. An example of this tokenizing follows:

(Numbers in parentheses represent hex token values. All other characters represent their equivalent ASCII value.)

untokenized: PRINT

"IT WORKS"

tokenized: (87) "IT WORKS"

When creating the BASIC command line in the middle of your machine language program, you must use the **TOKENS** for all BASIC key words and functions. Table 1 provides a key word vs. token table for your use in creating a tokenized BASIC command line. (Token values are listed in hex.) These are the values to use in place of key words listed. Note that the token for *PRINT* is hex 87 as was used in the above example.

The program listing accompanying this article (named *ROMCALL*) provides all initialization required to make ROM calls with this technique. It contains two sample ROM calls to the print and real math routines. A line by line explanation of the program follows. *ROMCALL* is written in position independent code, and will work with all versions of the BASIC ROMs in Color BASIC, Extended BASIC, or Disk BASIC computers. It uses only one ROM entry point in the Color BASIC ROM, and this entry point is the same in all versions.

Line numbers are given in the first column of the listing. Lines 1 and 2 are assembler directives. They indicate the program name and start the assembly at address \$3000.

Program execution begins at line 3 with the label *Start*. Lines 3 and 4 load the X register from the direct page address \$A6 and push this value on the stack. \$A6 contains a pointer (actually stored in locations \$00A6 and \$00A7) that is used by the BASIC interpreter to keep track of its location in a BASIC program or direct command line. Later in my program I will modify \$A6. Just to be safe, I am saving the original value of this pointer so that I can restore it (see lines 9, 10 and 11) before the program terminates.

Lines 5 and 6 do all preparation to make the first sample call to the ROM routine "SIN." A pointer to the tokenized command string "A=SIN(1)" is loaded into the X register and a branch to the subroutine "BASIC" is made.

KEY-WORD	TOKEN	KEY-WORD	TOKEN	KEY-WORD	TOKEN
FOR	80	AND	B0	PLAY	C9
GO	81	OR	B1	DLOAD	CA
REM	82	>	B2	RENUM	CB
'	83	=	B3	FN	CC
ELSE	84	<	B4	USING	CD
IF	85	SGN	FF 80	ATN	FF 94
DATA	86	INT	FF 81	COS	FF 95
PRINT	87	ABS	FF 82	TAN	FF 96
ON	88	USR	FF 83	EXP	FF 97
INPUT	89	RND	FF 84	FIX	FF 98
END	8A	SIN	FF 85	LOG	FF 99
NEXT	8B	PEEK	FF 86	POS	FF 9A
DIM	8C	LEN	FF 87	SQR	FF 9B
READ	8D	STR\$	FF 88	HEX\$	FF 9C
RUN	8E	VAL	FF 89	VARPTR	FF 9D
RESTORE	8F	ASC	FF 8A	INSTR	FF 9E
RETURN	90	CHR\$	FF 8B	TIMER	FF 9F
STOP	91	EOF	FF 8C	PPOINT	FF A0
POKE	92	JOYSTK	FF 8D	STRING\$	FF A1
CONT	93	LEFT\$	FF 8E		
LIST	94	RIGHT\$	FF 8F	DISK BASIC	
CLEAR	95	MID\$	FF 90	DIR	CE
NEW	96	POINT	FF 91	DRIVE	CF
CLOAD	97	INKEY\$	FF 92	FIELD	D0
CSAVE	98	MEM	FF 93	FILES	D1
OPEN	99			KILL	D2
CLOSE	9A	EXTENDED BASIC		LOAD	D3
LLIST	9B	DEL	B5	LSET	D4
SET	9C	EDIT	B6	MERGE	D5
RESET	9D	TRON	B7	RENAME	D6
CLS	9E	TROFF	B8	RSET	D7
MOTOR	9F	DEF	B9	SAVE	D8
SOUND	A0	LET	BA	WRITE	D9
AUDIO	A1	LINE	BB	VERIFY	DA
EXEC	A2	PCLS	BC	UNLOAD	DB
SKIPF	A3	PSET	BD	DSKINI	DC
TAB (	A4	PRESET	BE	BACKUP	DD
TO	A5	SCREEN	BF	COPY	DE
SUB	A6	PCLEAR	C0	DSKIS	DF
THEN	A7	COLOR	C1	DSKOS	E0
NOT	A8	CIRCLE	C2	CVN	FF A2
STEP	A9	PAINT	C3	FREE	FF A3
OFF	AA	GET	C4	LOC	FF A4
+	AB	PUT	C5	LOF	FF A5
-	AC	DRAW	C6	MKN\$	FF A6
*	AD	PCOPY	C7	AS	FF A7
/	AE	PMODE	C8		
^	AF				

Let me skip to lines 12 through 16 next. This is where the actual ROM call is made. First, line 12 stores the pointer to the command string (X register) in direct page address \$A6. Next the A register is loaded with the first byte of the command line (LDA ,X). Line 14 clears the carry flag bit in the condition code register. This is required to signal

the BASIC interpreter that a command line to execute follows. The other possibility is that a BASIC program line, with a line number, was being entered into memory. In this case, the BASIC interpreter would only store the line in the BASIC program storage area, not execute it. Line 15 makes the ROM call to execute the command line pointed to

Do it Your Way with **Flexi-Filer**TM

a comprehensive & flexible data base management system
for the Color Computer

- COLLECT:** Up to 35 elements per record, with up to 240 characters per record. You designate the name of each element, its position, and its format, (alphanumeric, numeric, money, date, exponential). The size of your database is unlimited—only your disk space will limit your files.
- ORGANIZE:** You determine how the information is displayed and stored. Your format can be changed anytime! Easy screen definition makes data entry simple.
- SELECT:** Using logical operators (less than, greater than, equal, and, or) you can select any subset of your data base with up to 36 different criteria.
- SORT:** All or any selected subset or records can be sorted in ascending or descending order by any of your 35 fields.
- REPORT:** Design customized reports and labels to fit your individual needs, including page headlines with titles, automatic page numbers, and column headers. Numeric fields can be totaled automatically for Summaries too! Printing your information in the format most useful to you is a snap!
- MANUAL:** Comprehensive documentation describes every feature and operation in easy to read terms.

TM
Flexi-Filer is the most comprehensive and flexible data management system available for the Color Computer. It is easy to use and very powerful. It is perfect for such applications as sophisticated mailing lists, inventory, sales records, expense records, etc. There are few limitations and many features that allow you to customize the system to fit almost any need. The manual is comprehensive and easy to read, making learning and using **Flexi-Filer** enjoyable for anyone.

Flexi-FilerTM requires 32K and a disk system. It runs with Radio Shack DOS only.

A MUST FOR ANYONE SERIOUS ABOUT COMPUTING!!!



6809 Specialists (619) 436-3512
Computerware is a trademark of Computerware

Dealer Inquiries Invited

\$64⁹⁵

TO ORDER: Add shipping of
\$2 surface or \$5 Air/Foreign

by \$A6,\$A7. This ROM call is a subroutine in the Color BASIC ROM that is called by BASIC's main command interpretation loop. The main command interpretation loop calls \$ADC6 when it is all set to execute the next command in a BASIC program, or in a direct command. Upon entry, it assumes that \$A6,\$A7 is pointing to the next BASIC command to execute, and that the A register contains the first byte of that command. After the ROM call returns, line 16 of this subroutine returns program control to the calling routine with an RTS. This subroutine, named BASIC, is the real key to making ROM calls. It may be called from any part of your machine language program to make a ROM call. The only entry requirement is that the X register must point to the tokenized BASIC command line that is to be executed.

Now back to the rest of the program. Lines 7 and 8 make a sample call (in the same manner as lines 5 and 6) to the ROM routine "PRINT."

Lines 9, 10 and 11 restore the original contents of the pointer \$A6,\$A7, and then return to the main calling program. This is the end of my sample program so this RTS will return to BASIC and the OK prompt.

Line 17 is where the tokenized BASIC command string is stored. This line was created as follows:

```
$41      ASCII value for letter "A"
$B3      Token for math operator "="
$FF,$85  Token for function "SIN"
$28      ASCII value for left paren. "("
$32      ASCII value for number "1"
$29      ASCII value for right paren. ")"
$0       Line terminator
```

Put them all together they spell A=SIN(1)

Line 18 stores a similar construction of the BASIC command PRINT A:

```
$87      Token for PRINT
$41      ASCII value for letter "A"
$0       Line terminator
```

Line 19 is an assembler directive that ends assembly and indicates to the assembler the address of the program entry point.

This completes the description of ROMCALL operation. Now I will point out some cautions you should observe when making ROM calls with this method. First, CLOADM and CSAVEM cannot be called in this manner. I will describe changes to this program to call these ROM routines at the end of the article. Second, BASIC does memory available checks during many of these ROM calls.

BASIC defines available memory as the space from where the free memory pointer is pointing up to the stack pointer register. (Free memory pointer is located at \$1F,\$20.) If your program has moved the STACK pointer very low in memory, BASIC may think you are out of memory (during a ROM call) and terminate your program with the familiar OM ERROR message. Third, if you define any numeric or string variables, BASIC will store them where it thinks variable storage and string storage have been allocated. You should not have any other important data here or it will be written over. Variable space is defined by the pointers located at the following addresses:

```
$1B,$1C  Start of simple variables
$1D,$1E  Start of array variables
$1F,$20  Start of free memory
$21,$22  Bottom of string storage space
$27,$28  Top of string storage space
```

These cautions can be summarized as follows: You must make sure your program stays away from memory used by BASIC, and be careful not to do anything that will prevent BASIC from being able to run (moving stack pointer so low that an out of memory error occurs, for example). You may make ROM calls to the routines CLEAR, PCLEAR, FILES, and DIM to modify the BASIC variable space pointers as you wish.

The two commands CLOADM and CSAVEM may be called with one change to the program given. This change is necessary because the BASIC interpreter handles the two commands as special cases in the main command interpretation loop, mentioned earlier. If BASIC sees a CLOAD or CSAVE token to execute, it does not call the ROM routine at \$ADC6. Instead, it calls a routine at \$8C62 for CLOAD, or \$831A for CSAVE. Therefore, to call CLOADM you must change line 15 to read JSR \$8C62. To call CSAVEM you must change line 15 to read JSR \$831A. The command string token for CLOADM or CSAVEM is created with the token for CLOAD or CSAVE followed by the ADCII value of "M" (\$4D).

I have not personally tried every possible ROM call using this method. If anyone finds one that does not work, I would be glad to hear from you, and offer some assistance if I can. From studying my disassembly of the BASIC ROMs, this method should work with any BASIC command that can be executed from within a BASIC program.

If you EXECUTE the sample program ROMCALL, you will be making ROM calls to the following BASIC commands:

Datacomp Computer Systems, 35 Farmstead Road, Short Hills, NJ 07078 (201) 376-6093

Call or write to order. Phones are answered 24 Hrs./day, 7 days/week.

TDP-100, 16 K from \$269
100% TRS-80 Color Computer compatible. Comes with a pair of Joysticks and a rompack.

C. ITOH Prowriter 8510 parallel printer. 120 CPS
3K buffer, hi-res graphics
1 year warranty \$395

NEW! PLANET FURY
by DCS Software. 32K ext. basic req'd. Just like Gravitar in the arcade. Hi-res graphics, 6 colors, sound. Only \$19.95 cassette.

Color Computer parallel printer interface \$69

TRS-80 Color Computer (TDP) Disk Drives
Drive 0 \$415
Drive 1 \$245

Wabash Diskettes. 1 year warranty. Certified 100% error free, w/hub rings.
SS/SD \$17.50/box of 10
SS/DD \$19.95/box of 10

We carry ALL Color Computer software including Tom Mix, Spectral, Med Systems, Computer Ware, Datasoft Intracolor, and more. Up to 25% discount. Call for more info!

All equipment carries manufacturers warranty. Prices do not include shipping.

The listing:

```

PAGE 0001          ROMCALL          by: CHARLES J ROSLUND

* ROM CALLS MADE EASY *
*****
0001 0E00          NAM ROMCALL
0002 0E00          ORG #3000          START CODE ANYWHERE (PIC)

* INITIALIZATION *
*****
0003 3000 9EA6          START LDX <#A6
0004 3002 3410          PSHS X          SAVE PROGRAM POINTER

* SAMPLE CALLS *
*****
0005 3004 30BD0017      LEAX MATHS,PCR  MATH STRING
0006 3008 BD0B          BSR BASIC

0007 300A 30BD0019      LEAX PRNTS,PCR  PRINT STRING
0008 300E BD05          BSR BASIC

* FIX POINTERS BEFORE EXITING *
*****
0009 3010 3510          PULS X
0010 3012 9FA6          STX <#A6          RESTORE POINTER
0011 3014 39          RTS

* EXECUTE COMMAND STRING SUBROUTINE *
* X POINTS TO TOKEN START *
*****
0012 3015 9FA6          BASIC STX <#A6          POINT TO STRING
0013 3017 A6B4          LDA ,X          GET TOKEN
0014 3019 1CFE          ANDCC #*FE      FLAG NOT A LINE #
0015 301B BDADC6        JSR #ADC6        CALL BASIC
0016 301E 39          RTS

* CONSTANT STRING AREA *
*****

* A=SIN(1) *
0017 301F 41B3FF8528    MATHS FCB #41,#B3,#FF,#85,#2B,#31,#29,0
                        A=SIN(1)

* PRINT A *
0018 3027 874100        PRNTS FCB #87,#41,0
                        PRINT A

0019 302A          END START

NO ERRORS FOUND
    
```

```

A=SIN(1)
PRINT A
    
```

You should see the floating point representation of SIN(1) displayed on your screen. Readers with assemblers can simply enter the source code from the listing and assemble it. If you don't have an assembler, you may *POKE* the hex values from the program listing (third column) into any free memory space. A monitor would make this job a lot easier. I located this sample program at \$3000. If you *POKE ROMCALL* into memory by hand, be sure to poke all eight values in line 17 (following the FCB) into memory. Only the first five are listed in column three due to the column width allocated.

Hint . . .

I would like to pass on a helpful hint for single disk drive owners to use when backing up a disk. Use

```

PCLEAR (ENTER)
FILES (ENTER)
BACKUP (ENTER)
    
```

This will speed up the process and make fewer disk switches necessary. I use this all the time and have never had a problem doing so.

Jim Lemaster

PARALLEL PRINTER INTERFACE

FOR THE RADIO SHACK COLOR COMPUTER
AND THE TDP 100

- * RUN ANY STANDARD PARALLEL PRINTER FROM THE SERIAL I/O PORT
- * WORKS WITH: EPSON, NEC, CENTRONICS, C-itoh, SMITH CORONA, RADIO SHACK, GEMINI, OR ANY STANDARD PARALLEL PRINTER
- * SWITCH SELECTABLE BAUD RATES FROM 300 to 9600
- * COMPLETE - ALL CABLES AND CONNECTORS INCLUDED
- * PRICE: \$69 plus \$3 for shipping and handling. Canadian orders add \$5 for shipping. Michigan residents add 4% sales tax.



PRINTERS

- C-itoh PROWRITER ----- \$ 365
- GEMINI 10 ----- \$ 310
- EPSON FX80 ----- \$ 570

Plus shipping

CALL FOR PRICES ON OTHER MODELS FROM THE ABOVE PRINTER MANUFACTURERS

BOTEK INSTRUMENTS

313-739-2910

Dealer inquiries invited

4949 HAMPSHIRE
UTICA, MICHIGAN 48087

COCOPRO

COCOSLOTS

"as well done computerized one-armed bandit as I can imagine".....JAN 1983 RAINBOW REVIEW.....

ONLY ----- \$12.00

REVERSI

OTHELLO "this is a very good show from COCOPRO".....DEC 1982 RAINBOW REVIEW.....

CHEAP ----- \$12.00

FULL SCREEN EDITOR

Use arrow-keys control for editing of basic programs. Much much more.

BARGAIN ----- \$15.00

COLOR DIRECTORY

This is the DIR command that you wish you had. Sorted DIR list with selection. Optional display to printer.

A MUST ----- \$12.00

EXPANDED DIRECTORY

Save up to 120 files on one diskette.

GOOD BUY ----- \$12.00

CASSETTE DIRECTORY

List program name, length, start, end and transfer address. Free with all orders if requested or send \$2.50 for program on cassette.

Above programs written in machine language for 16k. COCOSLOTS, REVERSI, CASSETTE DIRECTORY and FULL SCREEN EDITOR do not require EXTENDED BASIC!!! But are compatible with EXTENDED or DISK BASIC.

MASTER DIRECTORY

‡ Master listing by diskette number with description.

‡ Master listing of all your programs in either diskette or program sequence.

‡ Basic for easy customizing: fast mach lang sort

‡ Requires 32k with printer

BEST SELLER ----- \$20.00

*** FREE CATALOG ***

Send self addressed stamped envelope.

Send check or money-order to:

COCOPRO

P.O. BOX 37022

ST LOUIS, MO 63141



Postage paid on pre-paid orders in continental U.S..
MO residents add 5.625% sales tax.

Software Review

Data Communications Tutor Does the Job

In case you've ever wondered what magic is involved when two computers hold a conversation, the folks at Computerware have a tutorial program which is designed to teach a beginner the basic ideas and terminology involved in computer generated data communications.

Called, appropriately enough, *Introduction to Data Communications*, this instructional program, supplied on cassette or disk, is divided into five lessons so it can be loaded into 16K 80Cs. The first four parts are the instructional material which is presented one page at a time with about 15 screen pages per "lesson."

Colorful graphics are interspersed in the lessons showing visual examples of the material. For example, the material on acoustic modems has an illustration of a CPU, acoustic modem and a telephone handset suspended over the modem. Very nice use of the CoCo's graphic capabilities. The fifth section is a 10-question exam which determines what you have retained from the first four lessons. At the end of the test you are graded and to the chagrin of those not paying attention—critiqued. Just like my old school marm, Mrs. Grundy, nasty comments are given to those under-achieving, suggesting a review of the material.

The lessons are written by Computerware to be specifically applicable to transmitting and receiving data over telephone lines with the 80C.

Topics covered are:

- Definitions of data communications
- Examples of its uses
- Block diagram of a simple circuit
- The RS-232 Interface
- An explanation of the RS-232 signal
- Types of modulation
- Telephone line frequencies and level specs
- Baud and BPS
- Start and stop bits
- Asynchronous data

The lessons are presented in a concise manner on the screen. Each screen is advanced by the user at his own pace. Unfortunately, you cannot "back up" to review the material from previous pages without rerunning the program. The lessons auto-load from one series to another so the separation of the material into five parts is not a problem in use.

While Computerware has done a fine job of summarizing the basics of data communications relating to the 80C, I can't help but think that information of this type could be more effectively presented in a printed booklet. The student would be able to page back and forth to review the data.

For those who are interested in learning the basics of data communications through interaction with their CoCo, *Introduction to Data Communications* is the program.

(Computerware, Box 668, 4402 Manchester Ave., Suite 102, Encinitas, CA 92024, \$17.95 on tape, \$22.95 on disk)

—Bruce Rothermel

COLORSOFT™

ESCAPE

A 3-D GRAPHICS ADVENTURE WITH SOUND
(Machine Language for Fast Action)

This is NOT the usual "find the treasure" adventure. In **ESCAPE**, you are trapped on the top floor of a skyscraper and the only way out is by using a very unusual elevator. You must give the elevator the correct code or else the ride down is a real killer. The maze-like halls seem to come to life due to the fantastic 3-D graphics. Search the halls for rooms which contain clues to the correct code. Clues must be deciphered to learn the elevator's secret code. Game times depends on the skill of the player, but it is typically 8-10 hours. **ESCAPE** is suitable for group play. A mentally stimulating experience.

16K BASIC

\$18.95

RECIPE FILE

A CASSETTE BASED STORAGE AND
RETRIEVAL SYSTEM

This program permits storage of your favorite recipes for retrieval by your computer. Once a recipe has been recalled, then the computer can adjust the ingredient measure for serving the desired number of persons. Each recipe can contain special comments on preparation as well as the full instructions for using the recipe. Included is a line oriented text editor for creating and editing the variable length files. Completely menu driven and very user friendly. Easily modified by the user for use in keeping track of record, coin or stamp collections or whatever your interest. Screen or printer output.

16K Ext. BASIC

\$21.95

SPECIAL: A collection of 30 recipes covering main meals to snacks. Only \$3.95 with program.

SQUIRE

SQUIRE is a challenging game of asset management. The player must manage a country estate and contend with crop failure, investment losses, taxes and other such headaches. The object of the game is to increase the estate's value while providing for the peasant workers. The starting assets are computer selected so that each game offers different challenges. Great experience for the kids or aspiring executives.

16K Ext. BASIC

\$14.95

HOUSEHOLD EXPENSE MANAGER

This menu driven program package is designed for creating and maintaining a data file on cassette of 30 household expense categories for a 12-month period. It also keeps cumulative totals and a separate total of tax deductible expenses. A comparative analysis program provides a graphic presentation of relative expenses between any two months during the year. The user can change categories by modifying program code. Screen or printer output.

16K Ext. BASIC

\$19.95

FLIPPER

A fun and challenging version of the Othello™ type board games. This version includes options for play solely by the computer, one player against the computer, or two players against each other. The computer can play on four skill levels. Very colorful with plenty of sound. Fun for kids and challenging for adults. Great for parties.

16K Ext. BASIC

\$16.95

COLOR SOFTWARE SERVICES

P.O. BOX 1708, DEPT. R
GREENVILLE, TEXAS 75401

INCLUDE \$2.25 HANDLING PER ORDER
WRITE FOR FREE CATALOG

DEALER INQUIRES INVITED



TELEPHONE ORDERS
(214) 454-3674
9-4 Monday-Saturday

VISA/MASTERCARD

THE TOP-RATED COCO WORD PROCESSOR:

TELEWRITER-64

Colorware researched the word processors available for the Color Computer. We came to the very same conclusion that so many review articles have! Telewriter-64 is, by far, the superior word processor for the Color Computer.

Why is Telewriter so much better than the others? For one thing, it has overcome the 32x16 character display limitation of the Color Computer. No small feat, Telewriter accomplishes this by generating its own set of characters in software. You select 51x24, 64x24 or 85x24 character displays by merely issuing a format command. If you have ever used a word processing system, you know how important it is to be able to see a good portion of your text on the screen.



Telewriter-64 also generates true lower case characters. This is much preferable to the reverse characters that merely "represent" lower case letters in other co-co word processors.

Telewriter-64 is feature packed. Besides the standard features

found in any word processor, Telewriter also includes: user-friendly full-screen editing, rapid cursor and scrolling control, page jump, right justification, menu-driven disk or cassette access, compatibility with spelling checkers (such as Spell-and-Fix), and a clever double check that asks the user "Are you sure?" before executing any operation that would kill any sizeable amount of your text.

Telewriter-64 runs on any 16K, 32K, or 64K system (extended Basic not required) and works with any printer. It has all of the control codes necessary to take full advantage of all of the features in any

printer. There is even a "typewriter" mode which sends typed lines directly to your printer.

With advanced word processing software such as this, your color computer becomes a truly powerful word processing system, with a price that makes sense for the personal user.

Beyond impressive capability, Telewriter-64 simply makes any kind of writing a pleasure. It is a truly sophisticated system that is marvelously easy to learn and enjoyable to use.

Disk \$59.95
Cassette . \$49.95

EXTENSION CABLE FOR YOUR MODEM/PRINTER

Place your modem or printer where you want. 15 ft. cable with four-pin male and four-pin female DIN connectors.

\$19.95

COCO ROM/PROJECT/PRODUCT CASE



QUANTITY	PRICE EACH
2-4 (2 min.)	\$5.50
5-9	3.50
10-99	2.75
100 & up	CALL

Give a Professional look to your project or product

- Designed especially for the Color Computer ROM slot.
- High quality 3 piece injection molded black plastic with spring-loaded door.
- Same size and specifications as Radio Shack ROMpak

SUPER-PRO KEYBOARD

REPLACEMENT PROFESSIONAL KEYBOARD KIT... ONLY **\$69.95**

- Contour molded, full travel keys for fast smooth typing.
 - Custom made to fit precisely. Has same key layout.
 - Complete, easy instructions for any CoCo or TDP-100.
 - Ideal for word processing and other serious CoCo use.
- Note: For computers manufactured after Oct. 1982, add \$4.95

UPGRADE IN JUST MINUTES!

QUALITY DISK DRIVE CABLES



High quality cable and high force, gold plated contacts ensure the utmost in connection reliability for your CoCo or TDP-100.

- ① **Disk pack extender, 3 ft. . . \$29.95**
Allows you to move your disk drive interface back and out of the way.
- ② **One Drive Disk cable \$19.95**
- ③ **Two Drive Disk cable \$29.95**

COLORWARE LIGHT PEN



ONLY \$19.95
FREE PROGRAM CASSETTE INCLUDED

- Plugs directly into your joystick port.
- Comes with six fun & useful programs on tape.
- Easy instructions show how to use it with Basic.
- Comptible with light pen software such as Computer Island's "Fun-pak."



COLORWARE INC.
78-03F Jamaica Ave.
Woodhaven, NY 11421
(212) 647-2864



TOLL FREE ORDERING
800-221-0916



Orders only. NY & Info call (212) 647-2864

WE PAY shipping on any order that includes at least one game
Use our convenient toll free **800** line.



GHOST GOBBLER

From Spectral Associates, this "Pac" theme game is the best of it's type. Brilliant color, action and sound, just like an arcade gobble your way to glory, but watch for those ghosts! Get in on the wild fun of this game craze now. Tape: \$21.95, Disk: \$25.95

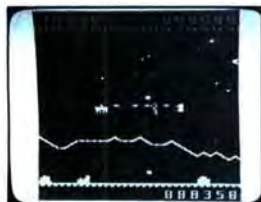
DONKEY KING

DONKEY KING

You simply can not buy a more impressive game for your color computer than this new wonder from Tom Mix. The graphics, sound, and animation are all just astonishing! There are four different graphic screens and each is endless fun. Requires 32K. Tape: \$24.95, Disk: \$27.95



GHOST GOBBLER



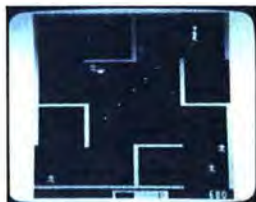
PROTECTORS

There are several good versions of the "Defender" theme available for the CoCo. None, however, rival this one from Tom Mix. No other game matches the detailed graphics and sheer excitement of this top seller. Requires 32K. Tape: \$24.95, Disk: \$27.95



CREATURE FEATURE

From Color Software, comes a lightening swift shoot & dodge the enemy game. It's clever cross between "Robotron" and "Berserk" themes, with bullets flying everywhere. Solid, shoot-em-up-fun. Requires 16K. Tape: \$17.95. Disk: \$19.95



ANDROID ATTACK

Spectral Associates' very well done "Berserk" type game with some interesting added features. Each cassette contains both the 16K and 32K version. The 32K version has voice output! Plenty of action. Tape: \$21.95



FROGGER

Just released by The Cornsoft Group, this is the officially licensed version from Sega, the arcade manufacturer. It has it all! 4 lane super highway, snakes, turtles, logs, alligators, etc. Lots of action and laughs! Requires 16K. Tape: \$19.95



INTERGALACTIC FORCE

Your space fighter roars into the Death Corridor. Lock-on and blast the enemy fighter from the sky. Now try dropping one into Death Star's narrow exhaust vent. It takes skill and guts. Good luck! With "Star Wars" theme song. From Anteco. Tape: \$24.95

THE COLORCADE..
SUPER JOYSTICK MODULE

ONLY
\$19.95



★ **It's a Joystick Interface.**

Now you can connect any Atari compatible joystick to your CoCo. These sticks are extremely rugged & provide very fast response and real arcade type action. They will improve the play of almost any game. The difference will amaze you!

★ **It's a Rapid Fire Module!**

Press the fire button on your joystick and get a great burst of fire instead of just a single shot! Adds tremendously to the many shooting type games that do not have repeat fire. With variable burst speed.

★ **It's a 6ft. Extender Cord.**

THE ATARI

ONLY
\$8.50



A well proven joystick, the Atari is known for being rugged and reliable. It gives good response and is the standard among home video players. Now at a great price! Use with module above.

ZIRCON VIDEO COMMAND

ONLY
\$14.95
A GREAT BUY!



This one has received outstanding reviews. Its unique design fits the hand beautifully and it has the truly fast and positive response needed for high speed play. Actually out-performs some joysticks that cost \$50 or more.

WICO FAMOUS "RED BALL"

THE BEST
YOU CAN BUY
\$34.95



The high performance joystick from the people who make them for the arcade machines. Built to take the abuse of even the most enthusiastic player. This is the best! Wico #15-9730. Use with module above.

ORDERING
INFORMATION

ADD \$2.00 PER ORDER FOR SHIPPING.
WE ACCEPT VISA, MASTERCARD, CHECKS, M.O.
C.O.D. ADD \$3.00 EXTRA.
NY RESIDENTS ADD SALES TAX.
OVERSEAS, FPO, APO, ADD 10%.
DEALER DISCOUNTS AVAILABLE.
IF ONE OR MORE GAMES ARE INCLUDED, SHIPPING IS FREE.



COLORWARE INC.
78-03F Jamaica Ave.
Woodhaven, NY 11421
(212) 647-2864



TOLL FREE ORDERING

800-221-0916

Orders only. NY & Info call (212) 647-2864

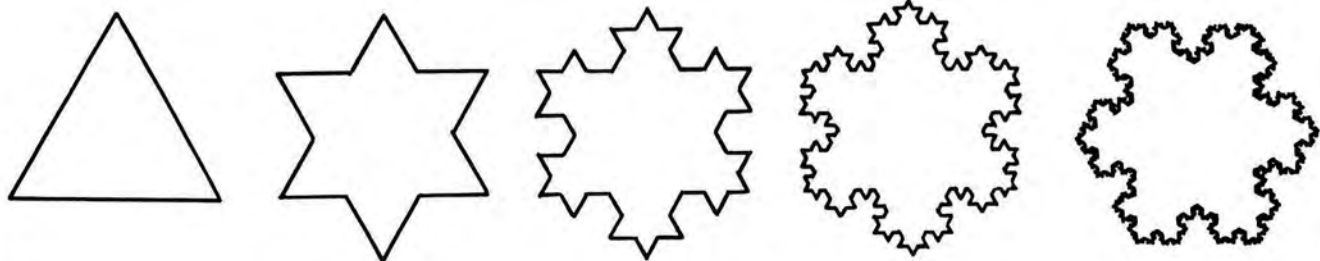
FASCINATING FRACTALS

Geometry of Nature

By Robert Delbourgo

Don't read any further. Just take a long hard look at the figure below. It is probably the most famous example of a "fractal" shape and is named the "Koch Snowflake" after its discovery by von Koch in 1904. Notice that each successive stage in the construction of the flake involves the addition of equilateral triangles (scaled down by $1/3$) along every segment of the perimeter; put another way, the perimeter is increased self-similarly by an extra $1/3$ at every consecutive stage. We probably agree that the fractal flake is a very beautiful shape, but you may be surprised to learn that until recently it was regarded as a mathematical monstrosity, to be shunned by any self-respecting scientist. The change in attitude, from monstrosity to curiosity to conventionality, is largely due to the efforts of Benoit Mandelbrot who, more than anyone, has put the subject on a respectable basis and showed its significance for describing the real physical world.

We'll be drawing some regular fractals shortly on the 80C but before we start let us see why fractals are so "odd" and therefore so fascinating. If you examine the stages in the snowflake construction, you will notice that the perimeter increases without limit as $(4/3)^N$, where N (which tends to infinity) stands for the stage you have reached. Yet the area of the flake stays perfectly finite! This is the first queer feature of a fractal and you should contrast it with commonplace geometrical figures where the perimeters are finite and simply go up as the square root of the enclosed areas. The second thing to notice is that more and more corners are



introduced with each consecutive stage in the construction; in the end so much jaggedness is introduced that it is impossible to draw a line which grazes the boundary anywhere. In the mathematical jargon, no tangents to the boundary curve exist—again this is quite contrary to our experience with ordinary geometrical shapes. Summarizing,

- 1) Boundaries of true fractals are infinite in extent,
- 2) No tangents may be drawn anywhere along a fractal boundary.

Notwithstanding these difficulties, Mandelbrot has shown that such behavior is quite natural in many physical settings

(Robert Delbourgo, a professor of Physics, and his schoolboy sons Tino, 13, and Daniel, 11, started computing as a hobby with the purchase last year of a CoCo.)

(e.g. the shape of a coastline, or the human vascular system) and he has put the idea on a firm mathematical foundation. I strongly urge you to read his magnificent book, *Fractals, Form, Chance and Dimension*, if you want to delve more into the topic. It is written mainly for non-experts and contains many striking examples of fractals, both regular and random, as well as a complete list of references.

There are four programs for your delectation, Fractals 0 to 3. The first is based on circles, the second on spokes, the third on cornered polygons and the fourth on edged polygons. Although they are somewhat different from one another, I suggest that you start by typing only two of them first; say Fractal 1 and Fractal 3. If you like what you see, carry on with the other two. Let me describe the main points about the programs for those of you who want to understand them more fully.

Listing: Fractal 0

Lines 1-7 provide the Title Card comprising Fractal Trees. Lines 8-9 give instructions.

Lines 10-24 draw the circles in ever smaller radii (ratio of π/N). Note the dimensioned arrays which locate the centers.

Lines 25-20 freeze and paint (if needed) the final fractal shape.

Listing: Fractal 1

Lines 1-7 produce a Fractal Root System as the title card. Lines 8-29 give instructions, drawing routine and final painting in order. This time the basic shape is a spoked figure and for aesthetic reasons the ratio of successive radii is $3.3/N$.

Listing: Fractal 2

Lines 1-8 give a Fractal Cornered Square. Lines 12-25 will draw the closed polygons at the corners of earlier ones. Here successive ratios are $3/(N+2)$ to keep the shapes within the confines of the screen. Lines 26-30 for freezing the picture.

Listing: Fractal 3

Lines 1-7 produce a Title Card of a Fractal Edged Square. Lines 11-28 draw the polygons, which touch along their sides this time. It is necessary to reposition the centers in this operation and this is carried out at the end of Lines 17, 20 and 24.

In all of these programs I have assumed that your computer is 16K ECB, which is why I have restricted the ranges of N values in the dimensioned arrays. Those of you with greater memory may like to relax these ranges. For instance, in the first listing, 32K people can change Line 19 to having $N>12$ and Line 22 to having $N>6$, etc. One last suggestion: Try randomizing your fractals by varying the directions arbitrarily in the several programs. For instance, changing Line 16 in Fractal 0 to

```
16 FORI=1TON:E=(RND(99*N))/99:A(I)=128+R*COS
(2*PI*E/N): U(I)=96+R*SIN(2*PI*E/N):CIRCLE
(A(I),U(I),R*PI/N,I:NEXTI
```

and make similar changes to Lines 18, 21, 24. Do you think that your final figure resembles a real map of a landscape?

5.....01C1
18.....046F
END...0604

Listing 0:

```
1 CLS:PRINT@3,"fractals 0 by r.
delbourgo";:PRINT@480,"15 willow
dene av, australia7005";
2 FORI=@T032STEP32:FORJ=232T0247
:POKE1024+I+J,128:NEXTJ,I:FORI=@
T01:FORJ=134T0358STEP32:POKE1024
+I+J,128:POKE1042+I+J,128:NEXTJ,
I:FORI=@T07:FORJ=99T0387STEP288:
POKE1024+I+J,128:POKE1042+I+J,12
8:NEXTJ,I
3 FORI=@T027STEP9:FORJ=@T064STEP
32:POKE1090+I+J,128:POKE1378+I+J
,128:NEXTJ,I
4 FORI=33T035:FORJ=@T0288STEP288
:FORK=@T027STEP9:POKE1024+I+J+K,
140:POKE1152+I+J+K,131:NEXTK,J,I
5 FORI=32T0160STEP128:FORJ=@T028
8STEP288:FORK=@T027STEP9:POKE102
4+I+J+K,138:POKE1028+I+J+K,133:N
EXTK,J,I
6 FORJ=64T0352STEP288:FORK=@T027
STEP9:POKE1024+J+K,139:POKE1028+
J+K,135:POKE1088+J+K,142:POKE109
```

CASSETTE CONTROLLER NEW

Allows you to hear your cassettes without unplugging cables. Switch knob between AUTO and MANUAL positions. \$25⁰⁰

SERIAL SWITCHER

Switch your serial port between two or three peripherals. 2-Port. \$25⁰⁰ 3-Port. \$30⁰⁰

TOTALLY SOLDERLESS KITS

4K - 16K	\$20 ⁰⁰
16K - 32K	\$35 ⁰⁰
4K - 32K	\$50 ⁰⁰

All memory upgrades come complete with 16K or 32K button, easy-to-follow instructions, and 90-day unconditional warranty.

PILOT LIGHT— Includes 5 different colored lenses, and simple instructions. Mounts in 5 minutes to top cover of your computer. With Lifetime Warranty, only \$7⁰⁰

I.C.s	CABLES
6809E CPU \$25 ⁰⁰	Direct Coax to TV-3', 6', 9', 12'.. \$10 ⁰⁰
6883 SAM \$25 ⁰⁰	* Serial M to M \$7 ⁰⁰
6847 VDG \$20 ⁰⁰	Serial M to M, coiled - 5' \$7 ⁰⁰
6821 PIA \$8 ⁰⁰	* Serial Ext. M to F \$7 ⁰⁰
Full Set. \$65 ⁰⁰	* Cass. Ext. M to F \$7 ⁰⁰
	Cass. Ext., coiled - 5' \$7 ⁰⁰
	* Joystick Ext. M to F \$7 ⁰⁰

★ FREE ★

CATALOGUE

*Prices shown are for 6 feet. Extra length, add 50¢ per ft.

Terms: Cashiers checks and money orders for immediate delivery • Personal checks allow 2 weeks • Orders under \$25 add \$2 shipping • C.O.D. add \$2 • California residents add 6%

4418 E. Chapman, Suite 284
Orange, CA. 92669

VIDTRON


```

2+J+K,141:NEXTK,J
7 PLAY"L2003CEG04C03GCEP1"
8 POKE65495,0:CLS:PRINT@352," AF
TER THE DRAWING IS FINISHED YO
U WILL HEAR A SOUND. PRESS <P
> TO PAINT OUT SURROUNDS OR <C
> TO CONTINUE.":PRINT@0," ENTER
MULTIPLICATION RATE OF CIRCLE
S (ANY INTEGER BETWEEN 4 AND
16)";:INPUTN:PI=3.14159265
9 IFN<4ORN>16THEN8
10 PMODE4,1:SCREEN1,1:PCLS
11 IFN<10THENR=N*7
12 IFN>9ANDN<12THENR=N*5
13 IFN>11THENR=70
14 CIRCLE(128,96),R,1
15 DIMA(N),U(N)
16 FORI=1TON:A(I)=128+R*COS(2*PI
*I/N):U(I)=96+R*SIN(2*PI*I/N):CI
RCLE(A(I),U(I)),R*PI/N,1:NEXTI
17 R=PI*R/N:DIMB(N*N),V(N*N)
18 FORI=1TON*N:B(I)=A(1+INT(I-1
)/N)+R*COS(2*PI*I/N):V(I)=U(1+INT
(I-1)/N)+R*SIN(2*PI*I/N):CIRCLE(
B(I),V(I)),R*PI/N,1:NEXTI
19 IFN>9THEN25
20 R=PI*R/N:DIMC(N*N*N),W(N*N*N)
21 FORI=1TON*N*N:C(I)=B(1+INT((I
-1)/N))+R*COS(2*PI*I/N):W(I)=V(1

```

```

+INT((I-1)/N))+R*SIN(2*PI*I/N):C
IRCLE(C(I),W(I)),R*PI/N,1:NEXTI
22 IFN>4THEN25
23 R=PI*R/N:DIMD(256):DIMX(256)
24 FORI=1TO256:D(I)=C(1+INT((I-1
)/4))+R*COS(PI*I/2):X(I)=W(1+INT
((I-1)/4))+R*SIN(PI*I/2):CIRCLE(
D(I),X(I)),R*PI/4,1:NEXTI
25 SOUND100,1
26 I$=INKEY$:IFI$=""THEN26
27 IFI$="P"THENPAINT(253,96),1,1
:PAINT(3,96),1,1:SCREEN1,0
28 IFI$="C"THENRUN8
29 GOTO26

```

8.....026E
19.....03DF
END ...05B0

Listing 1:

```

1 CLS0:R=127+16*RND(8):FORI=15TO
495STEP32:POKE1024+I,R:NEXTI:FOR
I=257TO285:POKE1024+I,R:NEXTI:FO
RI=104TO118:POKE1024+I,R:POKE134
4+I,R:NEXTI:POKE1484,R:POKE1490,
R
2 DATA44,50,105,117,172,178,197,
217,258,264,278,284,325,345,364,
370,425,437
3 FORI=1TO18:READD:POKE992+D,R:P
OKE1023+D,R:POKE1024+D,R:POKE102
5+D,R:POKE1056+D,R:NEXTI
4 PRINT@2,"fractals 1";:PRINT@16
,"by";:PRINT@19,"r.delbourgo";:P
RINT@480,"15,)willowdene av,aust
ralia7005";
7 PLAY"L2003CEG04C03GCEP1"
8 POKE65495,0:CLS:PRINT@352," AF
TER THE DRAWING IS FINISHED YO
U WILL HEAR A SOUND. PRESS <P
> TO PAINT OUT SURROUNDS OR <C
> TO CONTINUE.":PRINT@0," ENTER
MULTIPLICATION RATE OF SPIKES
(ANY INTEGER BETWEEN 4 AND
16)";:INPUTN:PI=3.14159265
9 IFN<4ORN>16THEN8
10 PMODE4,1:SCREEN1,1:PCLS:M=PI/
N
11 IFN<10THENR=N*7
12 IFN>9ANDN<12THENR=N*5
13 IFN>11THENR=70
15 DIMA(N),U(N)
16 FORI=1TON:A(I)=128+R*COS(M+2*
PI*I/N):U(I)=96+R*SIN(M+2*PI*I/N
):LINE(128,96)-(A(I),U(I)),PSET:
NEXTI
17 R=3.3*R/N:DIMB(N*N),V(N*N)
18 FORI=1TON*N:B(I)=A(1+INT(I-1
)/N)+R*COS(2*PI*I/N):V(I)=U(1+INT
(I-1)/N)+R*SIN(2*PI*I/N):LINE(B(
I),V(I))-(A(1+INT(I-1)/N),U(1+IN
T(I-1)/N)),PSET:NEXTI
19 IFN>10THEN25

```

Shifter

NEW

A talking "munch game" for 1 or 2 simultaneous players. Developed by MIT grad in machine language for incredible performance—at fastest speed, you can cross the screen in about 1 second. Shifting maze adds surprises. Players greet each other when meeting. Can select computer as opponent for 1 player.

\$20.

Articulator I

Add speech to your programs or change dialog in *Shifter*. Digitizes your voice from audio tape; sound track may be put on tape as part of other programs. Comes with Basic callable interface.

\$20.

Both available on cassette for 16 or 32K. Ext. Basic not required. Sticks required for *Shifter*.

29 ENTERPRISES

1208 Country Ct. · Cary, NC 27511

TO REALIZE THE FULL POWER & PERFORMANCE OF THE 6809, LOOK TO GIMIX.

GIMIX OFFERS YOU A VARIETY OF SS50 BUS COMPONENTS AND SYSTEMS.

OS-9 GMX III

The **GMX 6809 CPU III** and **OS-9 GMX III**. A Multi-user, Multi-tasking package for the ultimate in System Performance plus protection of the system and other users from crashes caused by errors in individual users programs

#01 (CPU & Software) **NEW!** \$1698.01

INTELLIGENT I/O PROCESSOR BOARDS increase system throughput by reducing interrupts to the host, buffering data transfers, and data preprocessing. Prices include on board firmware. Requires system drivers.

#11 3 port RS232 Serial (SS30) **NEW!** \$498.11

#12 4 port Parallel (SS50) \$538.12

OS-9 GMXIII drivers . . . (included when purchased with GMX III package) . . . \$200.00

OS-9 Level 2 users -- contact GIMIX for system requirements and availability.

192K GMX III #79 SYSTEMS: All include GMX 6809 CPU III and OS-9 GMX III (#01); a #11 3 port Intelligent serial I/O & cables; #19 Classy Chassis; 192KB Static RAM, #68 DMA controller, all necessary cables, power regulators, and filler plates. The OS-9 Editor, Assembler, Debugger, BASIC-09, and RUNB are included.

#79 with dual 40 track DSDD drives **NEW!** \$5998.79

#79 with dual 80 track DSDD drives \$6298.79

#79 with #88 8" Dual Drive Disk System \$7598.79

#79 with #90 19MB Winchester subsystem & one 80 track DSDD drive \$8998.79

UniFLEX for the GMX 6809 CPU III and Intelligent I/O boards is in development.

OS-9 GMX I; OS-9 GMX II; FLEX; and UniFLEX

The **#05 GIMIX 6809 PLUS CPU board** \$578.05

Options: GMX DAT \$35.00 SWTPC DAT \$15.00

9511A \$312.00 9512 \$265.00

#49 64KB GHOST SYSTEM includes: #05 CPU; #19 Classy Chassis; 64KB static RAM; a #43 2 port serial card & cables; #68 DMA Controller; all necessary cables, power regulators, and filler plates; GMXBUG monitor; FLEX; and OS-9 GMX I. You can software select either FLEX or OS-9. The OS-9 Editor, Assembler, Debugger, BASIC-09, and RUNB are also included.

#49 with dual 40 track DSDD drives \$4398.49

#49 with dual 80 track DSDD drives \$4698.49

#49 with #88 8" Dual Drive Disk System \$5998.49

#49 with #90 19MB Winchester subsystems & one 80 track DSDD drive \$7398.49

#39 128KB SYSTEM includes: #05 CPUwDAT; #19 Classy Chassis; 128KB of static RAM; a #43 2 port serial card & cables; #68 DMA Controller; all necessary cables, power regulators, and filler plates; GMXBUG monitor; FLEX; and OS-9 GMX II. You can software select either FLEX or OS-9. The OS-9 Editor, Assembler, Debugger, BASIC-09, and RUNB, and GMX-VDISK for FLEX are included.

#39 with dual 40 track DSDD drives \$4998.39

#39 with dual 80 track DSDD drives \$5298.39

#39 with #88 8" Dual Drive Disk System \$6598.39

#39 with #90 19MB Winchester subsystem & one 80 track DSDD drive \$7998.39

UniFLEX, available at extra cost, requires 8" or Winchester drives. A signed license agreement with TSC is required before shipment.

You can add to any GIMIX system RAM, I/Os and other options, or substitute non-volatile RAM. GIMIX will customize to your needs.

COMING SOON: Contact GIMIX for price and availability on 40MB and 72MB Winchester (5 1/4") drives, removable pack Winchesters, 256KB static RAM boards.

All GIMIX systems are guaranteed for 2MHz operation. GIMIX systems include documentation for all boards and software in a GIMIX binder. **ALL DRIVES ARE 100% TESTED AND ALIGNED BY GIMIX.**

ALL BOARDS AND SYSTEMS ARE ASSEMBLED, BURNED-IN, AND TESTED. GOLD-PLATED BUS CONNECTORS ARE USED.

TO ORDER BY MAIL: SEND CHECK OR MONEY ORDER OR USE YOUR VISA OR MASTER CHARGE. Please allow 3 weeks for personal checks to clear. U.S. orders add \$5 handling if order is under \$200.00. Foreign orders add \$10 handling if order is under \$200.00. Foreign orders over \$200.00 will be shipped via Emery Air Freight COLLECT, and we will charge no handling. All orders must be prepaid in U.S. funds. Please note that foreign checks have been taking about 8 weeks for collection so we would advise wiring money, or checks drawn on a bank account in the U.S. Our bank is the Continental Illinois National Bank of Chicago, 231 S. LaSalle Street, Chicago, IL 60693, account #73-32033. Visa or Master Charge also accepted.

EXPORT MODELS: ADD \$30 FOR 50Hz. POWER SUPPLIES.

GIMIX Inc. reserves the right to change pricing, terms, and product specifications at any time without further notice.

ALL PRICES ARE F.O.B. CHICAGO

Choose from GIMIX' wide variety of system components.

The **GIMIX CLASSY CHASSIS #19** consists of a heavyweight aluminum cabinet, constant voltage ferro-resonant power supply, and SS50 Mother board with baud rate generator board \$1398.19

Triple Disk regulator card and cables \$88.22 Baud rate generator card \$88.93

Missing cycle detector \$38.23 Filler plates \$14.92

Back panel connector plates (specify) \$8.60 50 Hz. option \$30.00

MEMORIES (GIMIX uses only Static RAM)

#67 64KB NMOS STATIC RAM board \$478.67

#64 64KB CMOS STATIC RAM board w/battery back-up \$568.64

#34 8K PROM board \$98.34

#32 16 socket PROM/ROM/RAM board \$238.32

I/O Boards (see above for Intelligent I/Os)

#41 Single port serial, RS232/20ma. current loop \$88.41

#43 2 port serial, RS232 \$128.43

#46 8 port serial, RS232 \$318.46

#42 2 port parallel \$88.42

#45 8 port parallel \$198.45

#50 serial, RS232, RS422, RS423 \$244.50

#52 SSDA serial, RS232, RS422, RS423 \$254.52

#54 ADLC serial, RS232, RS422, RS423 \$268.54

Each cable with connectors for back panel mounting (specify board) \$24.95

DISK CONTROLLERS

#68 DMA (featured in all systems above) \$588.68

#28 dbl. dens. programmed I/O (5" drives only) \$298.28

#58 single dens. programmed I/O (5" and/or 8" drives) \$226.58

#48 same as #58 but for 5" drives only \$198.48

Cable sets: 8" with Back Panel connector \$29.25

for two 8" external drives \$44.26

for two 5" drives \$34.96

SOFTWARE: GIMIX exclusive versions of OS-9/GMX I, II, III & FLEX are for GIMIX hardware only. All versions of OS-9 require the #68 controller. When ordered with any controller, FLEX is \$30.00

GMXBUG PROMs and manual \$98.65

Boot or Video boot PROM \$30.00 UniFLEX boot PROM \$50.00

OS-9 GMX I \$200.00 OS-9 GMX II \$500.00

Editor \$125.00 Assembler \$125.00

BASIC-09 \$200.00 RUNB \$100.00

DISK DRIVES FOR GIMIX SYSTEMS -- complete with cables and power regulators.

5" DSDD 40 track 2 for \$900.00

5" DSDD 80 track 2 for \$1300.00

#88" Dual 8" DSDD drives, cabinet, power supply, & cables \$2698.88

Cabinet only \$848.18 220V 50Hz. Option, add \$30.00

Filler plate \$14.83 Cable for 2 drives \$44.82

Cable for 4 drives \$67.84 Cable for cabinet to mainframe \$45.81

WINCHESTER SUBSYSTEMS: for use only in GIMIX systems with #68

DMA controller.

#90: includes one 19MB drive, interface, and Software \$3588.90

#91: includes two 19MB drives, interface and Software \$5288.91

Contact GIMIX for price and availability of other forthcoming subsystems.

OTHER BOARDS

#76 GHOST 80X24 VIDEO BOARD \$398.76

#66 50 pin Protoboards \$56.66 **#33 30 pin Protoboards** \$38.33

#03 6800 CPU \$224.03

#06 6800 CPU with timers \$288.06 Baud rate option, add \$30.00

#08 RELAY DRIVER (board, bracket, transformer, and 31 relays) \$113.00

#86 - #08 (board, bracket, transformer, without relays) \$73.00

#85 OPTO board \$8.85

WINDRUSH EPROM PROGRAMMER \$75.00

3" Binder \$12.00 2" Binder \$9.00

GIMIX DOES NOT GUARANTEE PERFORMANCE OF ANY GIMIX SYSTEMS, BOARDS OR SOFTWARE WHEN USED WITH OTHER MANUFACTURERS PRODUCT.

DON'T SEE IT??? ASK! OUR BROCHURE HAS MORE COMPLETE DESCRIPTIONS AND SPECS. PHONE OR WRITE TODAY FOR YOUR COPY.

BASIC-09 and OS-9 are trademarks of Microwave Systems Corp. and MOTOROLA, Inc. FLEX and UniFLEX are trademarks of Technical Systems Consultants, Inc. GIMIX, GHOST, GMX, CLASSY CHASSIS, are trademarks of GIMIX, Inc.



1337 WEST 37th PLACE • CHICAGO, ILLINOIS 60609
(312) 927-5510 • TWX 910-221-4055




```

20 R=3.3*R/N: DIMC(N*N*N), W(N*N*N)
21 FORI=1TON*N*N: C(I)=B(1+INT((I-1)/N))+R*COS(M+2*PI*I/N): W(I)=V(1+INT((I-1)/N))+R*SIN(M+2*PI*I/N): LINE(C(I), W(I))-(B(1+INT(I-1)/N), V(1+INT(I-1)/N)), PSET: NEXT I
22 IFN>5THEN25
23 R=3.3*R/N: DIMD(N*N*N*N): DIMX(N*N*N*N)
24 FORI=1TON*N*N*N: D(I)=C(1+INT((I-1)/N))+R*COS(2*PI*I/N): X(I)=W(1+INT((I-1)/N))+R*SIN(2*PI*I/N): LINE(D(I), X(I))-(C(1+INT(I-1)/N), W(1+INT(I-1)/N)), PSET: NEXT I
25 SOUND100,1
26 I$=INKEY$: IFI$="" THEN26
27 IFI$="P" THENPAINT(253,96),1,1: PAINT(3,96),1,1: SCREEN1,0
28 IFI$="C" THENRUNB
29 GOTO26

```

```

7..... 0306
20..... 0609
END ... 078B

```

Listing 2:

```

1 CLS: R=127+16*RND(8): FORI=0T06: FORJ=0T0480STEP32: POKE1024+I+J, R: POKE1049+I+J, R: NEXTJ, I: FORI=7T024: FORJ=0T032STEP32: POKE1024+I+J, R: POKE1472+I+J, R: NEXTJ, I

```

```

2 FORI=0T05: FORJ=0T032STEP32: POK E1101+I+J, R: POKE1421+I+J, R: NEXTJ, I: FORI=0T01: FORJ=0T096STEP32: PO KE1224+I+J, R: POKE1238+I+J, R: NEXT J, I
3 DATA4,10,16,22,132,150,260,278,388,394,400,406
4 FORI=1T012: READD: POKE1024+D, R-1: POKE1025+D, R-3: POKE1026+D, R-2: POKE1027+D, R-1: POKE1028+D, R-3: PO KE1029+D, R-2: POKE1056+D, R-4: POKE 1057+D, R-13: POKE1058+D, 128: POKE1 059+D, 128: POKE1060+D, R-14: POKE10 61+D, R-8
5 POKE1088+D, R-1: POKE1089+D, R-7: POKE1090+D, 128: POKE1091+D, 128: PO KE1092+D, R-11: POKE1093+D, R-2: POK E1120+D, R-4: POKE1121+D, R-12: POKE 1122+D, R-8: POKE1123+D, R-4: POKE11 24+D, R-12: POKE1125+D, R-8: NEXT I
6 FORJ=0T06: FORK=0T096STEP32: POK E1095+J+K, 128: POKE1107+J+K, 128: P OKE1351+J+K, 128: POKE1363+J+K, 128 : NEXTK, J
7 PRINT@203, "fractals 2";: PRINT@ 239, "by";: PRINT@267, "r.delbourgo ";: PRINT@328, "15,willowdene av"; : PRINT@360, "australia 7005";:
8 PLAY"03L20CEG04C03GECPI": POKE6 5495,0
9 CLS: PRINT@352, " WHEN YOU THE F RACTALS ARE ALL DRAWN YOU WILL HEAR A SOUND. PRESS <P> TO P AINT OUT THE SURROUNDS OR < C> TO CONTINUE."
10 PRINT@0, " ENTER THE NUMBER OF SIDES OF THE FRACTAL POLYGON (3 - 8)";: INPUTN: PI=3.14159265
11 IFN>8ORN<3THEN10
12 R=(N+4)*5.6: PMODE4, 1: SCREEN1, 1: PCLS
13 DIMA(N), U(N)
14 FORJ=1TON: A(J)=128+R*COS(2*PI *J/N): U(J)=96+R*SIN(2*PI*J/N): NE XTJ
15 FORJ=1TON: LINE(A(J), U(J))-(A( J+1-N*INT(J/N)), U(J+1-N*INT(J/N) )), PSET: NEXTJ
16 R=3*R/(N+2): DIMB(N*N), V(N*N)
17 FORI=1TON: FORJ=1TON: B(J+(I-1) *N)=A(I)+R*COS(2*PI*J/N): V(J+(I- 1)*N)=U(I)+R*SIN(2*PI*J/N): NEXTJ
18 FORJ=1TON: K=J+(I-1)*N: LINE(B( K), V(K))-(B(K+1-N*INT(J/N)), V(K+ 1-N*INT(J/N))), PSET: NEXTJ, I
19 R=3*R/(N+2): DIMC(N*N*N), W(N*N *N)
20 FORI=1TON*N: FORJ=1TON: C(J+(I- 1)*N)=B(I)+R*COS(2*PI*J/N): W(J+( I-1)*N)=V(I)+R*SIN(2*PI*J/N): NEX

```

COLOR COMPUTER Buyers Club

- Members enjoy a 30 - 40% savings on software!
- More being added monthly!
- Hardware & accessories at substantial savings!
- Monthly specials and reviews!
- Special orders service for members!
- No service charge for VISA or MC!
- Your savings can far exceed your dues!

Join Today And Start Saving!

Dues are \$22.50 - We accept



Personal Checks, M.O. or Charge It!



NAME _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

VISA MC Exp. Date _____ # _____

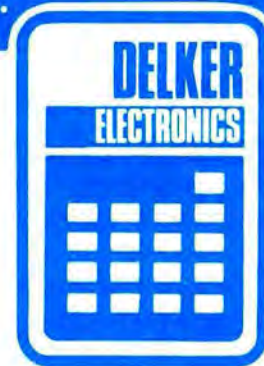
Mail to:

Color Computer Buyers Club
P.O. Box 241
Eaton Rapids, MI 48827

CoCo HEADQUARTERS

Looking to unlock the capacity of your Color Computer?
Search no more.....

TOLL FREE
1-800-251-5008



SPECIALS

Extended Basic	\$ 89.00	Super Pro Keyboard Kit	\$ 69.95
32/64k Upgrade	\$ 69.00	26-3004 Color Computer 16k	\$ 179.00
16k Upgrade	\$ 25.00	26-3002 Extended 16k CoCo	\$ 269.00
R/S Disk Controller	\$189.00	26-3003 32k Extended CoCo	\$ 379.00
1.1 Basic ROM	\$ 27.00	26-3003(d) 32/64k Ext. CoCo	\$ 349.00
Amdek Disk Drives	\$ Call!	26-1192 CGP-115 Printer	\$ 179.00

ACCESSORIES

Hayes SM1200 Modem	\$ 599.00	26-1208 CCR-81	\$ 52.00
USR AL212 (300/1200)	\$ 495.00	26-3008 Joysticks	\$ 22.00
Hayes SM 300 Modem	\$ 239.00	Kraft Joystick	\$ 49.95
R/S D.C. Modem 2	\$ 215.00	Wico Track Ball	\$ 59.95
USR AL300	\$ 199.00	Wico Joystick	\$ 29.00
R/S D.C. Modem 1	\$ 129.00	Wico Adapter	\$ 19.95
Hayes/USR Cable	\$ 19.00	Verbatim Disks	\$ 27.95
26-3020 Cable	\$ 5.25	Elephant Disks	\$ 25.00

SOFTWARE

Telewriter 64	\$ 59.95 (Disk)	Space Shuttle	\$ 28.95 (Cass)
Telewriter 64	\$ 49.95 (Cass)	Colorpede	\$ 29.95 (Cass)
Zaxxon by Sega	\$ 34.95 (C or D)	Mark Data Adventures	\$ 24.95 (Cass)
The King by Tom Mix	\$ 26.95 (Cass)	Ghost Gobbler	\$ 19.95 (Cass)
The Frog by Tom Mix	\$ 27.95 (Cass)	MSI DATABASE	\$ 39.95 (Disk)
Trapfall by Tom Mix	\$ 27.95 (Cass)	MSI Color Finance	\$ 59.95 (Disk)
The Bar Zapper	\$ 15.95 (Cass)	The Graph Zapper	\$ 15.95 (Cass)

**** All TRS-80 Software 13% off list ****

Others include - Spectral Associates, Anteco, Prickly Pear, Mark Data, Tom Mix, Botek Instruments, Intracolor Communications, Sugar Software, Cognitec, and many more!

TOLL FREE
TENNESSEE
1-800-545-2502

All of the above units covered by our 120 day carry in warranty. (d) denotes "Delker" (200ns) memory guaranteed for 1 year. TRS-80 Trademark Tandy Corporation. Prices subject to change without notice. Sale prices good through June 30, 1983. Write for our FREE newsletter!



TOLL FREE
1-800-251-5008

(DEALER INQUIRIES WELCOME)
DELKER ELECTRONICS, INC.
P.O. BOX 897
DEPT D
SMYRNA, TN 37167
800-251-5008
615-459-2636 (TENNESSEE)


```

TJ
21 FORJ=1TON:K=J+(I-1)*N:LINE(C(
K),W(K))-(C(K+1-N*INT(J/N)),W(K+
1-N*INT(J/N))),PSET:NEXTJ,I
22 IFN>4THEN26
23 R=3*R/(N+2):DIMD(N*N*N*N),X(N
*N*N*N)
24 FORI=1TON*N*N:FORJ=1TON:D(J+(
I-1)*N)=C(I)+R*COS(2*PI*J/N):X(J
+(I-1)*N)=W(I)+R*SIN(2*PI*J/N):N
EXTJ
25 FORJ=1TON:K=J+(I-1)*N:LINE(D(
K),X(K))-(D(K+1-N*INT(J/N)),X(K+
1-N*INT(J/N))),PSET:NEXTJ,I
26 SOUND100,1
27 I$=INKEY$:IFI$=""THEN27
28 IFI$="P"THENPAINT(253,96),1,1
:SCREEN1,0
29 IFI$="C"THENRUN9
30 GOTO27

```

```

8.....02C1
21.....0680
END...08EA

```

Listing 3:

```

1 R=RND(8):CLSR:FORJ=0TO11:FORK=
0TO224STEP32:POKE1162+J+K,128:NE
XTK,J:DATA16,132,278,394
2 FORI=1TO4:READD:FORJ=0TO5:FORK
=0TO96STEP32:POKE1024+J+K+D,128:
NEXTK,J,I:DATA13,71,86,129,217,2

```

```

60,348,391,406,464
3 FORI=5TO14:READD:FORJ=0TO2:FOR
K=0TO32STEP32:POKE1024+J+K+D,128
:NEXTK,J,I:DATA11,40,55,69,98,18
6,215,258,317,360,389,404,433
4 FORI=15TO27:READD:POKE1024+D,1
22+16*R:POKE1025+D,128:NEXTI:POK
E1152,128:POKE1407,128
5 DATA77,106,121,150,193,252,295
,324,412,441,455,470,499:FORI=28
TO40:READD:POKE1024+D,128:POKE10
25+D,117+16*R:NEXTI
6 PRINT@203,"fractals 3";:PRINT@
239,"by";:PRINT@267,"r.delbourgo
";:PRINT@299,"15,willowdene av";
:PRINT@331,"australia 7005";
7 PLAY"03L20CEG04C03GEC1":POKE6
5495,0
8 CLS:PRINT@352," WHEN THE FRACT
ALS ARE DRAWN A SOUND WILL BE
HEARD. PRESS <P> TO PAINT OUT S
URROUNDS OR <C> TO CONTINUE."
9 PRINT@0," ENTER THE NUMBER OF
SIDES OF THE FRACTAL POLYGON
(3 - 8)";:INPUTN:PI=3.14159265:M
=2/N
10 IFN>8ORN<3THEN9
11 R=(N+4)*5:Pmode4,1:SCREEN1,1:
PCLS
12 DIMA(N),U(N)
13 FORJ=1TON:A(J)=128+R*COS(2*PI
*J/N):U(J)=96+R*SIN(2*PI*J/N):NE
XTJ
14 FORJ=1TON:LINE(A(J),U(J))-(A(
J+1-N*INT(J/N)),U(J+1-N*INT(J/N)
)),PSET:NEXTJ:FORJ=1TON:A(J)=A(J
)+M*R*COS(2*(J+1)*PI/N):U(J)=U(J
)+M*R*SIN(2*(J+1)*PI/N):NEXTJ
15 R=M*R:DIMB(N*N),V(N*N)
16 FORI=1TON:FORJ=1TON:B(J+(I-1)
*N)=A(I)+R*COS(2*PI*(J+2)/N+PI):
V(J+(I-1)*N)=U(I)+R*SIN(2*PI*(J+
2)/N+PI):NEXTJ
17 FORJ=1TON:K=J+(I-1)*N:LINE(B(
K),V(K))-(B(K+1-N*INT(J/N)),V(K+
1-N*INT(J/N))),PSET:NEXTJ:FORJ=1
TON:K=J+(I-1)*N:B(K)=B(K)+M*R*CO
S(2*(J+3)*PI/N+PI):V(K)=V(K)+M*R
*SIN(2*(J+3)*PI/N+PI):NEXTJ,I
18 R=M*R:DIMC(N*N*N),W(N*N*N)
19 FORI=1TON*N:FORJ=1TON:C(J+(I-
1)*N)=B(I)+R*COS(2*PI*(J+2)/N+PI
*2/N):W(J+(I-1)*N)=V(I)+R*SIN(2*
PI*(J+2)/N+PI*2/N):NEXTJ
20 FORJ=1TON:K=J+(I-1)*N:LINE(C(
K),W(K))-(C(K+1-N*INT(J/N)),W(K+
1-N*INT(J/N))),PSET:NEXTJ:FORJ=1
TON:K=J+(I-1)*N:C(K)=C(K)+M*R*CO
S(2*(J+4)*PI/N):W(K)=W(K)+M*R*SI
N(2*(J+4)*PI/N):NEXTJ,I

```

wild party

A naughty, sexy computer game for 2 to 6 couples. Game varies every time you play. Your parties will be the hit of your neighborhood. All prompts from TV screen, no need to read complicated instructions.

On cassette tape.
For 16K Color Computer.
Extended BASIC not required.

\$35.00 incl postage.
(PA resid add \$2.10)
Send check to P.O. Box 210,
Jenkintown, PA 19046

b&b software

JUST
THE
BEST

The RAINBOW

THE COLOR COMPUTER MONTHLY MAGAZINE

It's called the *premier Color Computer magazine* for good reason. **The Rainbow** is the biggest, best, brightest and most comprehensive publication a happy CoCo ever had! Is there any wonder we get letters daily which praise **the Rainbow**, the magazine one reader calls "A Pot Of Gold" for his Color Computer?

The Rainbow features more programs, more information and more in-depth treatment of the TRS-80 Color, TDP System-100 and Dragon-32 computers than anyone else.

Each monthly issue is well over 200 pages and contains more than two dozen programs and 30 or more product reviews. And advertisements: **the Rainbow** is known as *the medium for advertisers* — which means it has a wealth of information about new products every month unavailable anywhere else! More than 120 companies advertise in its pages every month.

But what makes **the Rainbow** is its people. People like Bob Albrecht, the master teacher of computer programming. People like Don Inman, the world's finest computer graphics writer. People like Dick White, one of the most knowledgeable writers about BASIC going. Or Dennis Lewandowski, who has that certain knack of explaining assembly language to beginners. And award-winning Steve Blyn, **the Rainbow's** main educational columnist. These people, and others, visit you monthly through columns available only in **the Rainbow**.

Special programs on using **Spectaculator**. An income tax reporting system. **Complete Adventure** games and **Simulations**. **The Rainbow's** unique **Scoreboard** of arcade games. A column on educationally-oriented LOGO. The world's first four-color computer magazine centerfold! And much, much more.

Join the thousands who have found **the Rainbow** to be the absolute necessity for their CoCo. With all this going for it, is it surprising that more than 95 percent of **the Rainbow's** subscribers renew their subscriptions?

We're willing to bet that, a year from now, you'll be among them!

the Rainbow
9529 U.S. Highway 42
P.O. Box 209
Prospect, KY 40059

Get Your Very Own Pot O' Gold! Rainbow On Tape Tops Typing

Here's your chance to have a Pot O' Gold full of programs, articles and information about CoCo every month of the year! A subscription to **the Rainbow** is only \$22 and you won't miss a single chock-full issue.

As the premier magazine for the TRS-80 Color, TDP-100 and Dragon-32 computers, **the Rainbow** has more of everything — and greater variety, too. Do yourself and your CoCo a favor and subscribe to **the Rainbow** today!

We accept VISA, MasterCard and American Express. Non-U.S. rates higher. U.S. Currency only, please.

YES! Sign me up for a year (12 issues) of the Rainbow.

Name _____

Address _____

City _____ State _____ Zip _____

Payment Enclosed

Charge VISA MasterCard American Express

Account Number _____ Interbank # (MC only) _____

Signature _____ Card Expiration Date _____

Subscriptions to **the Rainbow** are \$22 a year in the United States. Canadian and Mexican rate is U.S. \$29. Surface rate elsewhere U.S. \$57. Air mail U.S. \$85. All subscriptions begin with the current issue. Please allow 5-6 weeks for first copy.

Tired of spending all your valuable computer time typing in those long, but wonderful, **Rainbow** programs each month? Now there is **Rainbow On Tape** to help ease the pain.

Each month all the lengthy programs (over 20 lines) in **the Rainbow** can come to you ready-to-run, thanks to **Rainbow On Tape**. More than 20 programs every month in all! At \$60 per year — or \$6.50 a tape — it is the biggest bargain going.

Back issues are available beginning with April, 1982. And each month's tape will be sent to coincide with the arrival of your current month's issue of **the Rainbow**.

YES! Sign me up for the biggest bargain going . . . Rainbow On Tape!

A Full Year for \$60 A Month for \$6.50 (Specify Month _____)

Name _____

Address _____

City _____ State _____ Zip _____

Payment Enclosed

Charge VISA MasterCard American Express

Account Number _____ Interbank # (MC only) _____

Signature _____ Card Expiration Date _____

Subscriptions to **Rainbow On Tape** are \$60 in the United States, U.S. \$70 in Canada and Mexico and U.S. \$85 in other countries. Non-U.S. orders for single issues add U.S. \$2 to cover additional postage. Duties are the responsibility of the purchaser.

JUST
THE
BEST

The **RAINBOW**
THE COLOR COMPUTER MONTHLY MAGAZINE

It's called the *premier Color Computer magazine* for good reason. **The Rainbow** is the biggest, best, brightest and most comprehensive publication a happy CoCo ever had! Is there any wonder we get letters daily which praise **the Rainbow**, the magazine one reader calls "A Pot Of Gold" for his Color Computer?

The Rainbow features more programs, more information and more in-depth treatment of the TRS-80 Color, TDP System-100 and Dragon-32 computers than anyone else.

Each monthly issue is well over 200 pages and contains more than two dozen programs and 30 or more product reviews. And advertisements: **the Rainbow** is known as *the* medium for advertisers — which means it has a wealth of information about new products every month unavailable anywhere else! More than 120 companies advertise in its pages every month.

But what makes **the Rainbow** is its people. People like Bob Albrecht, the master teacher of computer programming. People like Don Inman, the world's finest computer graphics writer. People like Dick White, one of the most knowledgeable writers about BASIC going. Or Dennis Lewandowski, who has that certain knack of explaining assembly language to beginners. And award-winning Steve Blyn, **the Rainbow's** main educational columnist. These people, and others, visit you monthly through columns available only in **the Rainbow**.

Special programs on using *Spectaculator*. An income tax reporting system. Complete Adventure games and Simulations. *The Rainbow's* unique *Scoreboard* of arcade games. A column on educationally-oriented LOGO. The world's first four-color computer magazine centerfold! And much, much more.

Join the thousands who have found **the Rainbow** to be the absolute necessity for their CoCo. With all this going for it, is it surprising that more than 95 percent of **the Rainbow's** subscribers renew their subscriptions?

We're willing to bet that, a year from now, you'll be among them!

the Rainbow
9529 U.S. Highway 42
P.O. Box 209
Prospect, KY 40059

BUSINESS REPLY CARD

First Class

PERMIT No. 1

Prospect, KY

POSTAGE WILL BE PAID BY ADDRESSEE

RAINBOW

P. O. Box 209

Prospect, KY 4005



NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES



BUSINESS REPLY CARD

First Class

PERMIT No. 1

Prospect, KY

POSTAGE WILL BE PAID BY ADDRESSEE

RAINBOW

P. O. Box 209

Prospect, KY 4005



NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES




```

21 IFN>4THEN29
22 R=M*R:DIMD(N*N*N*N),X(N*N*N*N)
)
23 FORI=1TON*N*N:N:FORJ=1TON:D(J+(I-1)*N)=C(I)+R*COS(2*PI*J/N+PI):
X(J+(I-1)*N)=W(I)+R*SIN(2*PI*J/N+PI):NEXTJ
24 FORJ=1TON:K=J+(I-1)*N:LINE(D(K),X(K))-(D(K+1-N*INT(J/N)),X(K+1-N*INT(J/N))),PSET:NEXTJ:FORJ=1TON:K=J+(I-1)*N:D(K)=D(K)+M*R*CO
S(2*(J-4)*PI/N+PI/N):X(K)=X(K)+M*R*SIN(2*(J-4)*PI/N+PI/N):NEXTJ,
I
25 IFN>3THEN29
26 R=M*R:DIME(N*N*N*N*N),Y(N*N*N*N*N)
27 FORI=1TON*N*N*N:N:FORJ=1TON:E(J+(I-1)*N)=D(I)+R*COS(2*PI*(J+3)/N):Y(J+(I-1)*N)=X(I)+R*SIN(2*PI*(J+3)/N):NEXTJ
28 FORJ=1TON:K=J+(I-1)*N:LINE(E(K),Y(K))-(E(K+1-N*INT(J/N)),Y(K+1-N*INT(J/N))),PSET:NEXTJ,I
29 SOUND100,1
30 I$=INKEY$:IFI$=""THEN30
31 IFI$="P"THENPAINT(253,96),1,1:SCREEN1,0
32 IFI$="C"THENRUNB
33 GOTO30

```

Video Plus

connects the Color Computer to a composite video monitor.

you'll love the crisp, clear picture with no RF interference.

Fully assembled and tested.

Easy to install - no soldering. everything you need is included.

Guaranteed to work. Tested on many brands, so you know you have a quality product.

Does not disable your TV interface. Change from monitor to TV and back or display both!

Works with color and monochrome monitors - any composite video/monitor can be used.

Easy adjustment optimizes the video signal exactly for your monitor and computer.

Works with every motherboard version!

Dealer Inquiries Invited



Box 668
Encinitas, Ca. 92024
(619) 436-3512

\$24.95
(plus \$2 shipping)

HAPPY ANNIVERSARY, RAINBOW !!

SOOPER PAC - BEAR BONES SOFTWARE - SOOPER



\$ 21.95

16 K

STANDARD BASIC

Scoopertag
Pac

BY
M. J. FREEMAN

BEAR BONES SOFTWARE
Suite 108
G-3117 Corunna Road
Flint, Michigan 48504

SOOPER PAC - BEAR BONES SOFTWARE - SOOPER PAC - BEAR BONES

SOOPER PAC - BEAR BONES SOFTWARE - SOOPER

THE SECRETS OF SUCCESSFUL SOFTWARE SUBMISSIONS

BY TOM NELSON
RAINBOW CONTRIBUTING EDITOR

Independent software authors face a bewildering assortment of problems in trying to present software to the software house for marketing, or should I say, the software industry faces these problems. The problems are latent, and many authors, and perhaps even software houses, are often not aware of them.

The problems arise from the ever-present potential for one person to misappropriate the ideas or programs of another, or for an author to perceive that a software house has stolen the author's programs or ideas. There's always the reality that it is much easier to just steal someone's source code, slightly modify it, and then publish it as a "different" program without giving the author credit than it would be to independently develop the software. It must be said here that any company that did this would not last long in the industry. On the other hand, since software houses are continually developing their own software, misunderstandings can easily arise if a company later markets a piece of software with a similar theme to that submitted by an independent author at some earlier date.

This tremendous potential for actual rip-offs or perceived rip-offs cries for a solution to clarify the relationship which will be entered into between the author and the software house. Both sides have legitimate interests which must be dealt with before any software is sent or received. Honest authors and software houses have no desire or intent to cheat one another, but both sides also have legitimate fears that they may be cheated or subjected to a frivolous lawsuit. To the rescue the software submission agreement.

Software submission agreements are universally used in industries which market products based on "intellectual property" such as software. The underlying purpose of the agreement is to inform the author that submitted software will not be held in confidence, but the author will have all protection afforded by the copyright laws. As an example of one of these agreements I will present here the core language

of the software submission agreement used by a well-known company. This agreement is representative of agreements used by many companies.

This submission agreement is in the form of a letter. It is sent in response to inquiries about submitting software, or in response to software submitted without first having inquired in advance about the company's policies. The agreement first indicates that this agreement must form the basis for any submission. It then introduces the company and its policies toward outside submissions, and the need for a submission agreement. The remainder of the agreement is

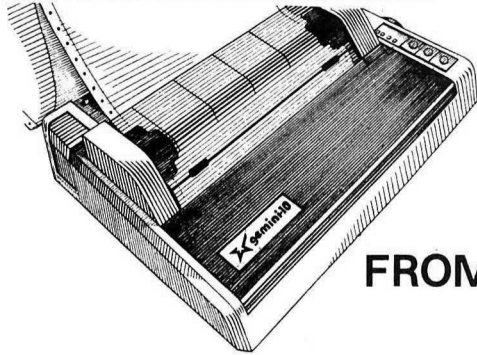


(Tom Nelson is a Special Assistant Attorney General for the State of Minnesota representing various state agencies, and a consultant to Nelson Software Systems. He has written almost all the manuals for the programs in the Super "Color" Library.)

One Stop Shopping For The Color Computer.



THE POWER BEHIND THE PRINTED WORD.



FROM \$399

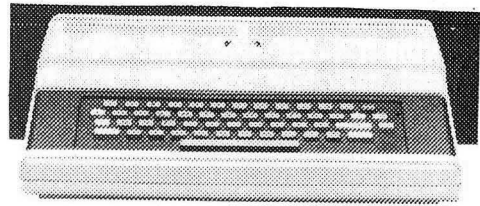
MORE QUALITY 100 cps • thrupt time of 48 lpm • resolution (120x144) bit image & block (6x6) graphics • extra fast forms feed

MORE FLEXIBILITY: super/subscript • underlining • backspacing • double strike mode • emphasized print mode • 4k buffer option • compatible with most software supporting leading printers • 10" carriage • 15" carriage Gemini-15 available

MORE RELIABILITY: 180 day warranty (90 days for head & ribbon) • mtbf rate of more than 5 million lines • print head life of more than 100 million characters

Botek Serial To Parallel Interface \$69.95

Mark Data Keyboards \$69.95



The System 100 from Tandy.

Use it to battle starships, play computer chess, set up a household budget, learn a language, or magically create your own computer drawing.

Then when you're ready for a full-featured computer system, you can move up with real economy. All you do is plug in accessories and expand your computer about as fast as your own curiosity.

64K MEMORY
EXTENDED
BASIC



only \$399

(While supplies last)

FROM EIGHTY COMPUTER SERVICES

— — — — COCO MAIL — — — —

- Up to 200 names per disk
- Each file contains: Name, Address, City, State, Zip, Phone, Code and Notes
- Prints 2 across or single labels
- Files can be moved from one disk to another
- Min Sys: 16K and 1 Disk \$59.95

We are a stocking dealer for most manufacturers of software, including:

Aardvark
Armadillo
Cognitec
Computer Island
Computerware
Custom Software
DSL
Data Soft

Eigen Systems
M & S Software
Mark Data
Micro Tech. Products
Moreton Bay
Nelson Systems
Platinum Software
Prickly Pear

Rainbow Connection
Southern Software
Sugar Software
Superior Graphics
Tom Mix
York 10

— DEALER INQUIRIES INVITED —

Please include phone number with all orders. Also add \$5.00 S/H for all printer and computer orders \$2.00 for all software orders. Ohio residents please add 6% state sales tax.

1-800-242-COCO

(OUTSIDE OHIO)



3170 W. Central Avenue
Westgate Meadows Shopping Center
Toledo, OH 43606

PHONE (419) 537-1432 (IN OHIO)
11 a.m. to 9 p.m. EST



devoted to the terms for submissions. Many companies will discuss royalty arrangements and their general philosophy of marketing software as well. The operative language of the agreement is, of course, the most important. The following terms are exemplary:

In order to protect both your rights and the rights of the company we will retain your submission in the Legal Department files, and we will consider your submission only upon the following conditions:

- 1) All sketches, drawings and written disclosures must be submitted by way of copy only, and the company shall have the right to retain such copies in its files. These copies may not be returned to the submitter.
- 2) The company shall have the right to consult others as to the value of and interest in ideas and disclosures submitted to it by the outside person. The company shall only consult others when, in its sole judgment, it deems it necessary and desirable for all parties involved. The company shall not be placed under any obligation whatever to the submitter as a result of having consulted or disclosed submitted ideas to others in an attempt to evaluate the idea and disclosures, and to determine the commercial interest in such ideas.
- 3) If the company should decide not to adopt an idea or disclosure, it is understood that the company is not required to divulge any reason for not adopting the idea or disclosure, it being understood that in doing so, the company may be placed in a position of a prema-

ture disclosure of its future plans.

4) It is understood that the submitter shall retain all rights and remedies afforded him by the patent and copyright laws of the United States, and that in no event shall the company have any obligation to the submitter for the unauthorized use or disclosure to others of any disclosure, whether or not patented or the subject matter of copyright or trademark protection, which the submitter may make, except specifically those obligations imposed upon the company and its subsidiaries by either the patent laws of the United States through the grant of a valid patent in which the claims thereof have covered the idea submitted or the copyright laws of the United States through the grant of a valid copyright registration on the material submitted. Further, the submitter hereby warrants and represents that the idea submitted by him is wholly original with him, and that there are no other persons, firms, or organizations made a party to this understanding that have any interests or rights in the submitted idea or disclosures that may in any way affect the company. The submitter further agrees that any subsequent submissions or supplements to the submission made hereinbefore shall be subject to the terms and conditions of this agreement.

5) The mere receipt of a submitted idea, whether solicited or unsolicited, by the company, and whether relating to a patentable subject matter, copyright, or trademark shall not imply any contractual obligation

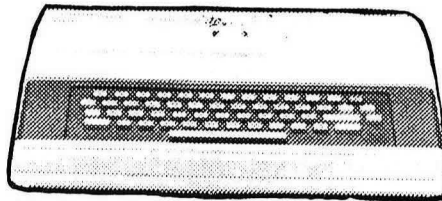


40 TRK SS/DD
w/ RS DISK CONTROLLER
DOS MANUAL Included!

SHUGART or TEAC
1 YEAR WARRANTY

* RADIO SHACK COLOR COMPUTERS *

16K COLOR BASIC \$ 179
16K EXTENDED COLOR BASIC \$269
32/64K EXTENDED COLOR BASIC \$369



MASTERCARD/VISA WELCOME
FOREIGN ORDERS WELCOME!

NEW 5 DAY SHIPPING
SCHEDULES (IF STOCKED)

* RADIO SHACK/ TANDY * EPSON * OKIDATA *
* TRANSTAR * MANNESMAN-TALLY * STARKITS *
* TOM MIX * MARK DATA * BMC * AMDEK * NEC *
* BOTEK * MSI * SHROUT SW * NELSON SW *
* MORETON BAY * DERRINGER SW * DATASOFT *
* CUSTOM SW ENGRG * SOUTHERN SW SYSTEMS*
* TAXAN * PRICKLY PEAR * SPECTRAL * ANTECO *
* COMPUTERWARE * EIGEN SYSTEMS * COLORSOFT *
* BERTAMAX * COGNITEC * DRESSERHAUS *

EMERALD COMPUTER SERVICES
4401 219th SW
MOUNTLAKE TERRACE, WASH. 98043

206-778-9826

** FACTORY AUTHORIZED PRINTER
REPAIR- EPSON, OKIDATA, TRANSTAR

*** TEAC Thinline 40 TRK DRIVES
*** TANDON DS/DD 40 TRK DRIVES

***COMPOSITE VIDEO CIRCUIT
***MEMORY UPGRADES D-E-F BOARDS

ALSO PRESENTING:

MORROW DESIGNS 

MICRO DECISION

whatever on the part of the company except as to the obligation of the company to evaluate the idea in a manner it deems best and to determine its interest in any valid patent, copyright, or trademark right thereunder.

6) All disclosures, whether solicited or unsolicited, submitted by outsiders and any supplements thereto must be in writing. The officers, agents, and employees of the company may not make any oral commitments of the company with respect to any disclosures. If any statements are made by the officers, agents, or em-

7) If the subject matter offered to the company is know-how, trade secrets, a proposed trademark, advertising slogan, merchandising plan, business idea, whether or not in use or generally known, or whether or not susceptible to trademark or copyright protection, the company will examine it only under the terms set forth in this agreement.

As you can see, these clauses cover rather completely the potential problems and concerns relating to the submission of software. The first clause gives the company the right to retain submitted copies. This is to protect the company against any future claims by giving it evidence of exactly what was submitted. The second clause gives the company the right to consult with experts and people outside of the company to determine the marketability of the submission. This allows the company to fairly and completely assess the value of the submission before it risks the substantial capital investment which must be made regarding the new product. The third clause makes it clear that the company does not have to give a reason for its rejection of the submission. This is necessary since otherwise it may be forced to announce its future plans, a highly guarded and valuable trade secret. The fourth clause provides the limitation on the submitter's remedies. It is a disclaimer of liability for unauthorized disclosure of the submitted idea with express recognition of any rights the submitter may have under copyright or patent law. The clause also contains a statement by the submitter that he or she is the sole owner of the submission. This protects the company against claims of others that the sub-

"The problems arise from the ever-present potential for one person to misappropriate the ideas or programs of another, or for an author to perceive that a software house has stolen the author's programs or ideas."

ployees of the company to a submitter which the submitter intends to rely upon, the submitter shall submit a record thereof, in writing, immediately to the company. Failure to furnish a supporting statement will have the effect of invalidating any oral conversation.

for 13" TV



\$25.50 TS-1 15W x 11D x 4H

MONITOR (TV) STANDS

for 19" TV

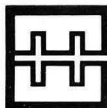


\$35.50 TS-4 24W x 11D x 4H

- ventilator holes
- slot for ROM pack

Colors available: ivory, smoked gray
deduct \$1.00/stand for clear

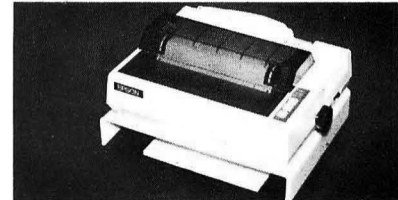
1 Year guarantee on plastic and workmanship.
Stand may be returned within 30 days for refund if not satisfied.



Howard Medical Company

Box 2 Chicago, Illinois 60690
(312) 994-2444

for printers



\$19.95 PS-1 15W x 11D x 4H

\$22.50 PS-2 same as above with
slot for bottom feed
printers

Please send me the following stands:

Cat #	Quan.	Color	Price
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

Shipping _____

IL Residents Add 6% _____

Total _____

Name _____

Address _____

City/State _____

Zip _____

We pay shipping on pre-paid orders

mitter stole their idea and is trying to sell it. The clause further binds the submitter to the terms of the agreement for any future submissions or supplements. This provision helps avoid excessive paperwork, and recognizes an ongoing relationship.

The fifth clause is important. It makes it clear that the company is only agreeing to review the submission, not to market the submission. The clause helps to avoid misunderstandings. The sixth clause is an attempt to avoid unnecessary disputes arising from any telephone calls or the like. It merely requires that anything to be a part of the final agreement must be in writing, and any oral agreements must be made a part of the agreement or be considered waived. The careful author will be sure to write down the nature of any telephone conversation and compare it with the terms of any future written contract. The final clause reinforces the fact that the submission will be considered only under the terms set out in the agreement.

Okay, now you've seen a sample agreement, so how should you handle your submissions? First, do not just send in your program to a software house without first contacting them. Give them a call in advance. They should be willing to tell you the general terms of any future agreement, and also whether they are even interested in evaluating your program. You can also tell a lot by just bantering with them for a while. You can save a lot of valuable time by finding out in advance whether the company will even consider marketing your program. In fact, I would recommend that you call companies even before you begin developing your program so that you do not spend a lot of time developing a program

only to later learn that no one wants it or that it is acceptable only with significant modifications. If you develop a good working relationship early, you can make maximum use of the company's rich marketing experience.

If the company is interested, ask for a copy of their submission agreement, and also feel free to ask to see a

"The underlying purpose of the agreement is to inform the author that submitted software will not be held in confidence, but the author will have all protection afforded by the copyright laws . . ."

sample contract. When you receive the submission agreement, sign it and send it together with your program. Companies differ in the form in which they wish to see your program. I feel it is inadvisable to submit any source code before you have a signed agreement to market your software. Any competent company can evaluate your program from a copy of the object code alone. Of course, this does not apply to those submitting BASIC programs.

Some companies will also require that you give them an option to market your software. Signing such an option agreement will give the company an irrevocable right to market your software if they exercise the right within a given time period, say 30 days. This agreement will supply all the terms of the marketing agreement, and must be read carefully. Option agreements will be discussed more fully in a later column.

Once you have submitted your software, the waiting game begins. If you are not under an option agreement, be sure to check back with the company after a reasonable period of time, say 30 to 60 days. By the way, it is not good practice to submit software simultaneously to more than one company. If either finds out about the other, and they usually ask you, neither will be happy, and probably will reject your program out-of-hand.

With the submission agreement the relationships are clearly set out. Doubt should no longer be present. Now you are ready to advance to the next step of the process of getting your software marketed. Let's assume your program is accepted. Now it's time to get down to contract negotiations. My next column will discuss contract fundamentals to prepare you for the process of negotiating a contract. Until then, good luck with your submissions.

(The information given in this article is not legal advice. If you have legal questions you should see competent legal counsel.)



Not just another "defenders" game! Brilliant graphics show wide angle & close-up views of the city you protect. You must save your people from attacking space creatures who try to capture them. Your ship has forward & reverse thrusters, long range phasers & quick maneuverability. Nerble Force requires **only one joystick** & you'll learn a whole new style of joystick control. Several levels of play!

cassette \$24⁹⁵ disk \$29⁹⁵ add \$2⁰⁰ shipping

COMPUTERWARE®
Box 668 • Encinitas, CA 92024

Dealer Inquiries Invited (619) 436-3512

**624 KBYTE
SYSTEM!**



ONLY \$599⁰⁰
(Including 2 Diskettes)

**New
3" disk
cartridge**

COLOR AMDISK-III COMPATIBLE.

The AMDISK-III micro-floppy disk system is an engineering breakthrough in disk size, storage capacity, media protection and user convenience. It's fully compatible with your Radio Shack*® Color Computer. Enjoy a full 624 KByte† (formatted) storage capability and the extra convenience of the new 3" hard plastic encased diskettes. They fit into a shirt pocket and are easy to mail, too.

The AMDISK-III drive system is ruggedly constructed for years of trouble-free operation, and is backed with our 90 day warranty on parts and labor.

Just circle the reader service number to receive complete specifications.

*Radio Shack is a registered trademark of Tandy Corporation.
†Requires recording on both sides.

DEALER INQUIRIES
INVITED

2201 Lively Blvd. • Elk Grove Village, IL 60007
(312) 364-1180 TLX: 25-4786

AMDEK CORP.

REGIONAL OFFICES: Calif. (714) 662-3949 • Texas (817) 498-2334

Amdek . . . your guide to innovative computing!

Home Money Manager Good Transaction Tracker

Home Money Manager (H.M.M.) is a disk based checkbook program that will keep track of all transactions associated with your checkbook. It is written in BASIC and will run on a 16K system with a printer. *H.M.M.* is a "menu" driven program that will keep track of your checks, deposits, automatic transfers, bank charges, etc. To begin using the program you first create a new check file. The CoCo will ask you for a starting balance and let you name up to 26 accounts. Now you are ready to start entering information from your check register. The CoCo will ask for five pieces of information: check number, date, paid to, amount, and account number. As you enter each transaction, CoCo computes your current balance and displays it on the screen. Data entries are easy to change if you make a mistake.

H.M.M. has one feature I really like. Let's say you purchased three different items (gasoline, clothes, and curtains) last month with a credit card. Now of course you pay this bill with only one check, but if you are trying to run a budget you would want the total amount broken down and charged to three different accounts. *H.M.M.* will allow you to distribute the appropriate amount to each account by re-entering the same check number for each account.

Once you have entered your monthly data, *H.M.M.* will allow you to go back and view any entries you want on the screen. At this point you can delete or edit records as necessary. Two other features probably would not be used often, but nevertheless are useful. The first is the ability to change account names originally specified when creating the file. The other feature allows you to change the current balance.

You may need this if, for instance, you transposed numbers when entering a check or deposit, or do not wish to enter bank charges as an expense.

There are four reports available with *H.M.M.* The first is a "transactions report." This report will printout a chronological record of all entries made to the checking account. The second report is a "deposits report." It will print out a chronological record of all deposits made to the checking account. The next report, as you may have guessed by now, is the "expenses report." It will print out a chronological record of all withdrawals made from the checking account. All three of these reports can be printed for the month just completed or for a range of one day to as long as you cover in the file. The fourth report prints out the monthly totals for each of your accounts and also the year-to-date totals.

I found *H.M.M.* to be a user friendly program. The eight pages of documentation are excellently written and you will have a good understanding of how *H.M.M.* works after reading the documentation just once. There is even a demonstration file included with the program to familiarize you with all the features of *H.M.M.* before entering your own data.

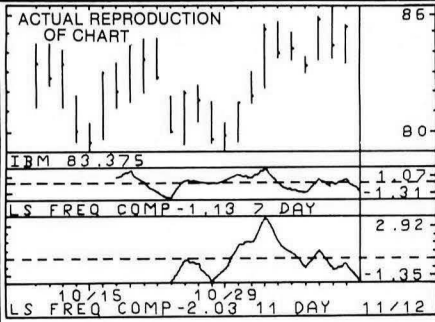
The only thing you may not like about *H.M.M.* is that it's a bit slow. I entered two months data into my file which was about 95 transactions. When I requested a report to be printed, it took two minutes and 40 seconds to sort the checks before starting to print. A full year's data may very well take over 10 minutes to sort. This is a lot faster than any of us could do by hand, but some of you might find it irritating.

With a 16K machine *H.M.M.* will let you record up to 480 transactions. Since the program is written in BASIC, I'm sure it could be modified fairly easily to handle more if you have over 16K.

If you are looking for a program to organize your income and expenses, then I recommend *Home Money Manager*.

(Computerware, Box 668, Encinitas, CA 92024, \$19.95)

—Michael Hunt



**BETTER THAN HIGHER COST
PACKAGES RUNNING ON
"BIGGER" MACHINES**

- Stocks, Options *and* Commodities
- Dow Jones *and* Compuserve input
- Optional *unattended run mode*

TRS-80® Tandy Corp. Requires 32 K, Ext. Basic, 1 or 2 disks, Printer

GAIN AN UNFAIR ADVANTAGE!

WITH INVESTOGRAPH

ON YOUR TRS-80 COLOR COMPUTER

IN-DEPTH, TIMELY INVESTMENT ANALYSIS WITH LESS WORK

Gain the advantage of using the power of the Color Computer to make more money in the market. The easy-to-use, menu driven INVESTOGRAPH software package provides:

- Automatic data entry by the highly rated COLORCOME.
- Screen *and* hard copy graphs with prices, volumes, moving averages, cycle components, momentum, OBV, security comparisons, channels, and several other exclusive oscillators.
- Complete data maintenance utilities.
- Optional unattended run mode - have dinner while COCO works for you!

YES! I want an UNFAIR ADVANTAGE.

Send INVESTOGRAPH rush at the INTRODUCTORY PRICE of U.S. \$245.00 (plus 5% in Texas). Includes full set of data and program diskettes with complete, easy-to-use documentation, 1 year warranty.

Name _____

Address _____

City _____ State / Zip _____

Check Money Order Visa Mastercard

Card No. _____ Expires _____

Signature _____

Order by phone, call (512)778-5260

Dealer Inquiries Welcome

Liberty Hill Software

P.O. Box 306 • Liberty Hill, Texas 78642

Like Word Games? *Scramble's* For You

It's difficult to argue that your typical space games and pac-like thrillers don't challenge the mind, because they often do require concentration and mental alertness. It's probably safe to say that they don't require a lot of intellectual skills.

And after a steady diet of arcade games, it is a welcome change to be challenged by computer programs that test your vocabulary skills. Take *Scramble*, for example, a new creation by Kaleidoscopic Creations of Melrose Park, Ill. It's a word game, which can involve up to four players for hours in creative activity, competition and just plain fun.

The participants, after entering their names, can compete on four levels. The first level allows only words (with 4 to 15 letters) to be entered, and contestants have two and a half minutes to guess the answer. The next level allows words and names, but only two minutes are allotted. The third requires names and titles, with only a minute and a half for answers. The highest level asks for titles and phrases, and there is only one minute.

When a player's turn comes up, his or her name appears on the screen. The opposition types in the word or phrase on the screen and then presses the "/" key, signaling the computers to scramble the terms. (Oh, yes, the player whose turn it is is expected to turn his head while the phrase is being entered.) The phrase takes about five to 10 seconds to be scrambled, which I found a little annoying, but I guess is understandable. If a typing error is committed while entering a word, pressing the "*" key allows you to make corrections.

In order to unscramble the word(s), you must begin with the first position and proceed in order of the word to be spelled. If you type in the wrong letter, a beep sound is emitted by the computer. If there is a space between words, it must be entered or you receive the same signal. This seemed to be a kind of contradiction for me, because phrases appear on the screen as one continuous line of letters, making it very difficult to determine the easier parts of a phrase. All levels of play allow for 10 errors before your turn is over. Bonus points are given for guessing the word(s) before time runs out, but they do not exceed the points awarded for correct unscrambling—which makes you wonder why they are called bonuses.

The game requires only 16K and does not require Extended BASIC. It is written in machine language.

If your experience is like mine, in that you've still not been able to get the female members of the family hooked on the computer, *Scramble* may be the program for which you have been looking. That's assuming, of course, that you do want the ladies to share your time on the CoCo.

(Kaleidoscopic Creations, P.O. Box 1284, Melrose Park, IL 60160, \$15.95 tape)

—Charles Springer

TANDON DISK DRIVES for your COCO

Features

Fully software compatible

6ms track-to-track

40 tracks

Higher quality

DRIVE 0 \$449.

DRIVE 1 \$249.

PRINTERS

STAR GEMINI 10 \$379.

STAR GEMINI 15 \$519.

OKIDATA 80 \$349.

PROWRITER \$469.

GX100P \$249.

BOTEK PARRALLEL ADAPTER \$69.

16K CHIP SET \$14.95

64K CHIP SET \$64.

WICO JOYSTICK \$25.

WICO-COCO ADAPTER \$17.95

HAYS SMART MODEM \$239.

VERBATIM SS/DD 10box \$25.95

**USE OUR WATTS LINE FOR A QUOTE
ON ANY COMPUTER PRODUCT**

**VISA, MASTER CARD, MONEY ORDERS,
PERSONAL CHECKS REQUIRE 3 WEEKS**

COMPUKIT

1-800-231-6671 order line

1-713-480-6000 technical line

**16206D HICKORY KNOLL
HOUSTON, TEXAS 77059**

Minidos:

Two Ring Circus for CoCo

*Double your pleasure with **Minidos**, a miniature version of a new virtual disk operating system which will hold two BASIC programs in memory at once.*

By Dr. Laurence D. Preble

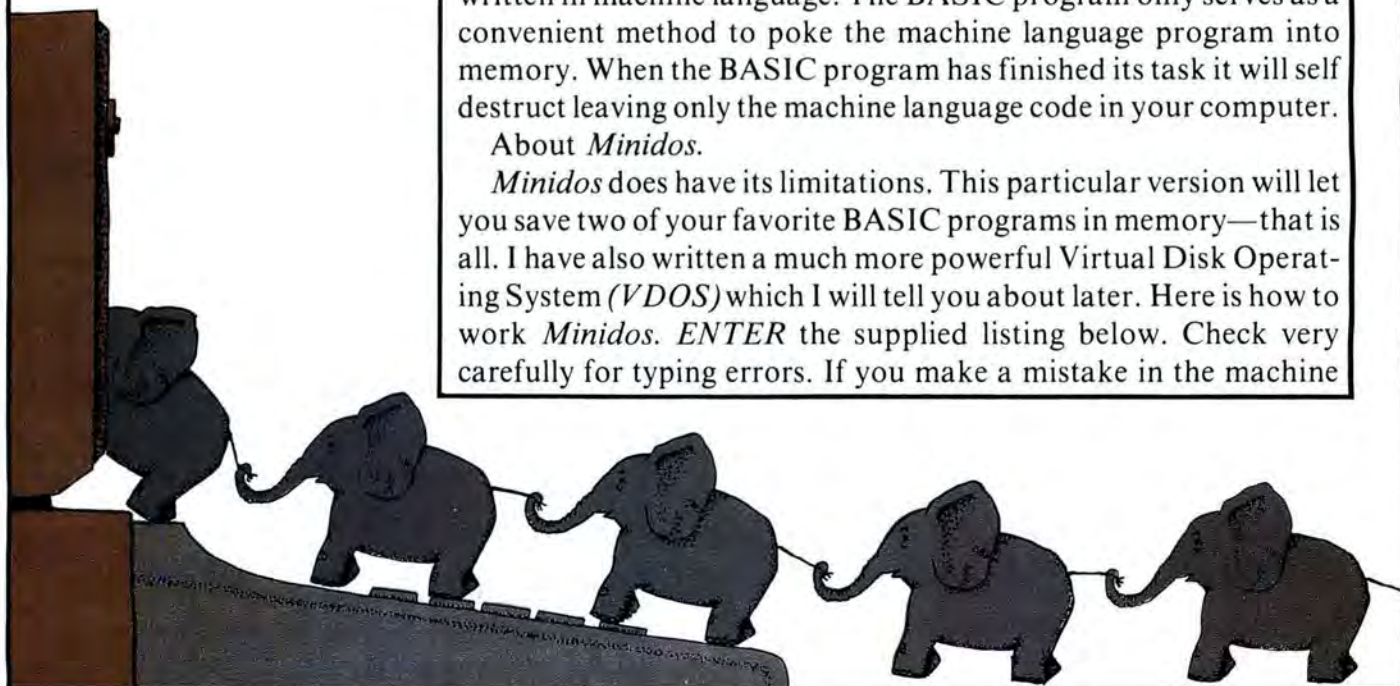
The Color Computer offers several alternatives for saving and loading programs. There is cassette tape which works fine but is very time consuming. For the more fortunate, there is floppy disk which is much faster but quite expensive. Some experimenters have even managed to interface a hard disk to the Color Computer which is extremely fast and extremely expensive. There is one more alternative which is even faster than hard disk but will fit anybody's budget.

It will fit anybody's budget because I am going to give it away to each reader. This final method is memory to memory storage. I will call this method *Minidos* because it acts like a Virtual Disk Operating System. Of course, there is no physical disk involved. *Minidos* is a software technique which is reproduced below.

Do not be fooled by the BASIC program listing. *Minidos* was written in machine language. The BASIC program only serves as a convenient method to poke the machine language program into memory. When the BASIC program has finished its task it will self destruct leaving only the machine language code in your computer.

About *Minidos*.

Minidos does have its limitations. This particular version will let you save two of your favorite BASIC programs in memory—that is all. I have also written a much more powerful Virtual Disk Operating System (*VDOS*) which I will tell you about later. Here is how to work *Minidos*. ENTER the supplied listing below. Check very carefully for typing errors. If you make a mistake in the machine



Turn your color computer on to the power of FLEX

NOW FROM THE WORLDS LARGEST SUPPLIER OF SOFTWARE FOR FLEX
COMES FHL COLOR FLEX. JUST LOOK AT THESE FEATURES:

**IF YOU'RE TIRED OF
NO DISK SOFTWARE,
THEN FHL Color FLEX
IS THE ANSWER!**

FLEX is the world's most popular operating system for the 6809 and with over 150 programs, we are the largest supplier of software for FLEX. These programs are NOT games but serious programs for your Color Computer. They range from word processors thru business applications to software development tools. Many Fortune 500 companies use our software. FHL Color FLEX turns your Color computer into a powerful system more capable than systems costing several times as much.

See our NEW 32 page catalog in the Jan.'83 issue of COLOR COMPUTER NEWS featuring over 150 products for FLEX, or send \$3.00 to us and we will see that you receive a copy!!

FLEX NOW ONLY \$99

- NEW - "Tiny Editor"
- NEW - Interactive Assembler (Tiny ASM)
- NEW - Machine Language Monitor
- NEW - Video attributes include status lines, protected lines, and inverse video
- Hi-Res screen formats
 - 16 x 32 and 24 x 51, upper and lower case characters
 - 24 x 64 and 32 x 64 upper case
- Full ASCII keyboards
- Easy start-up—just type "FLEX"
- On-line assistance—Just type HELP
- Optionally use a standard terminal and printer
- Advance disk I/O and terminal capabilities - Supporting 35, 40, and 80 track single or double sided, single or double density drives
- No additional hardware required
- We have supported FLEX with more than any one else in the world for more than two years!

SPECIAL

1. DBASIC, RS Disk Basic under FLEX with a utility to copy RS to FLEX disk \$30.
2. ED/ASM, line and screen editor with conditional macro assembler, both more powerful than TSC's and at the same cost, only \$100.
3. COLOR UTILITIES, a set of 12 utilities especially designed for FHL COLOR FLEX \$50.



THE REGENCY TOWER
770 JAMES ST. SYRACUSE, NY 13203
TELEX 646740 . (315) 474-7856

FHL FRANK
HOGG
LABORATORY

*FLEX is a trademark of Technical Systems Consultants Inc.

10%

10%

LIMIT: One order per customer

COUPON

This offer good towards purchase of software/hardware
with proof of FHL FLEX purchase.

10%



10%

Save up to \$200 on your next order when you buy FLEX from Frank Hogg Laboratory. That's right, you can save twice as much as you paid for FLEX when you order anything from FHL. Here's how it works. If you buy FLEX from us or have purchased our FLEX in the last 6 months then take a copy of your invoice and this coupon and send it in with your order of software and/or hardware from our catalog. Everything in our catalog is included! Suppose that your order was for \$500. You would send in \$450 and the copy of your invoice for FLEX and this coupon, saving \$50. To save the maximum of \$200, your order would have to total \$2000. This special applies whether you bought FHL Flex from us or from one of our dealers, however, the 10% discount is only available from us.

This deal is good for ONE order only per customer. What I mean by that is you can only use the coupon ONCE.

Only FHL, with over 150 products in our catalog can offer you as good a deal as this. If you take advantage of some of our other deals in the catalog the savings are significant.

This special 10% promotion will run for at least the next 3 months, and if it works out for us, we will make it a permanent thing.

(EXCEPTIONS: The 10% discount cannot be applied to SPECIAL sale prices. We will note these exceptions when they occur.)



THE REGENCY TOWER
770 JAMES ST. • SYRACUSE, NY 13203
TELEX 646740 • (315) 474-7856

STYLOGRAPH™

6809 WORD PROCESSING SYSTEM

AVAILABLE FOR FLEX™, UniFLEX™, and OS-9™

The STYLOGRAPH text processing system is a very easy to use but powerful method of creating and printing text. It allows the operator to type text on the CoCo, modifying and correcting it as it's typed, and then print it out. The STYLOGRAPH SYSTEM is cursor-oriented with dynamic screen formatting. Cursor based editing means that any portion of the text may be worked on by moving the cursor to that point. Dynamic screen formatting means that the text is formatted on the screen in the same way it will appear on the printed copy. The display is continuously updated to show how the text will appear. This is a very important feature and is normally available only on very expensive commercial word processing systems. It significantly reduces the time required to produce a finished copy.

FULL FEATURED TEXT EDITING

A full array of commands help in the creation and modification of text. The text displayed on the screen may be moved up, down, left or right. The cursor can be moved to any page or to any specified series of letters or words. The cursor itself can be moved left, right, up, down, to any tab position, or to the extreme left or right. Any block of text can be moved, copied or deleted. The operator may also do a **global replace** so that all occurrences of a given string will be replaced with or without a "prompt" asking if the item should be replaced.

OPERATOR CONVENIENCE

Files longer than memory can be edited. The operator can move forward through a long text file by selectively dumping text to the disk or filling from the disk.

The supervisor mode is **menu driven** and self prompting so that the operator does not have to remember the syntax of commands. This makes it easier for new operators to use the system.

An "assist" or "**help**" function makes it easy to learn the system since it is normally not necessary to consult the manual to learn the commands. This function is menu driven and lists all of the keyboard functions and the formatting commands.

At the beginning of the text the operator normally types in a few simple commands indicating the line length, left margin, and so forth, and then enters the header and footer as they should appear. After that the operator need not worry about formatting since it is taken care of automatically. Words that extend beyond the end of the line are automatically removed and placed on the next line. **Headers and footers** are automatically inserted so that the operator always knows what portion of the page is being worked on. **Ghost hyphens** can be entered so that if the word falls at the end of a line, and a ghost hyphen has been inserted, the hyphen will automatically be added.

FLEXIBLE DISPLAY

Lines longer than the screen width are allowed. STYLOGRAPH can scroll right and left on the screen so that tables can be constructed and appear on the screen exactly as they will appear on the print out.

A command allows viewing of the formatting commands on the screen. Another command allows the operator to see which characters will be modified at print out by underlining, superscripting or boldface. A page status command shows the current format values and other useful information.

COMPLETE FORMATING CONTROL

The text of individual lines may be centered, left justified, right justified, or right and left justified. **Tab**s can be set or cleared at any point. Spacing of the lines on the page is under complete operator control with end of page, spacing and vertical tab commands.

While entering text, it may be specified that the characters have some kind of modification when they are printed, such as underlining, superscript, boldface, overline, or subscript. These character modifications are done with "control" key strokes. For example, to start underlining characters, simply hold down the "CTRL" key, hit the "U" key and continue entering text. To stop underlining, hit the "DEL" or "RUB" key.

POWERFUL PRINTING OPTIONS

Underlining is supported on TTY type printers. For those people who have specialty printers there are a variety of additional capabilities including:

- 1.5 line spacing
- BOLDFACE**
- superscript¹
- subscript₁
- underline, overline,
- or any combination

Right and left justification of text is accomplished by incremental printing on TTY type printers. True proportional spacing is supported on the specialty printers.

Control codes may be embedded in the text for special applications. For example, some printers require special control sequences for double width, graphics or boldface. These sequences may be embedded in the text for those users that have these printers. In conjunction with this, it is possible to cause the printer to stop in the middle of a print out for changing printwheels. A backspace feature allows overstriking.

OPERATING SYSTEM COMPATIBILITY

STYLOGRAPH is compatible with the FLEX, UniFlex, and OS-9 disk operating systems. Text files prepared using STYLOGRAPH are directly usable by other software such as BASIC and the assembler. (This significantly aids software development since cursor-based editing allows full viewing of the text being worked on, thereby reducing errors and decreasing programming time). File size is limited only by the capacity of the disk system. Files may be loaded into the text at any point making it possible to rapidly create "boiler plate" documents using portions of text that have been previously saved to a text file. Any portion of a text may be saved to a text file for use at a later point. The printer output may be directed to a disk file for later print spooling. Most operating system commands are directly accessible without leaving STYLOGRAPH.

FULLY ADAPTABLE TO MOST PRINTERS

STYLOGRAPH is easily configured by the user for most terminals so there is no need to send for updates as equipment changes are made. Source code of the terminal interface is supplied so that users with unusual equipment configurations may adapt it to their systems. The source code for all of the "prompts" is also supplied so that foreign language versions may be easily constructed.

Printers currently included as standard are: Diablo, Qume, Starwriter, NEC 5515/25, NEC 5510/20; CENTRONICS 737/739; TTY type printer with backspace function; TTY type printer without backspace function.

COMPLETE INSTRUCTIONS

A special tutorial section is included in the manual so that people with little or no computer experience can easily learn to use STYLOGRAPH in a few hours. A text file is included which demonstrates most of the features of STYLOGRAPH and allows the operator to practice most of the functions. The logical arrangement of the commands and the immediate display of the results greatly simplifies the learning process. In addition there is an "assistance" command which helps the new operator learn the commands.

STYLOGRAPH MAIL MERGE

A major option of STYLOGRAPH is the related MAIL MERGE program. This program adds "form letter" capability to STYLOGRAPH. Variables such as names addresses, dates, may be taken from a disk file or the keyboard at print out time and inserted into the text. Successive letters may be printed out without operator intervention.

The second important capability of the MAIL MERGE program allows many STYLOGRAPH text files to be appended at print out time. This allows files to be edited in smaller, more convenient blocks and then appended at print out time so that the page numbers will remain consecutive and the headers and footers will automatically be retained through all of the print out.

STYLOGRAPH SPELLING CHECKER

Another major option of STYLOGRAPH is the related SPELLING CHECKER program. This program reads through a text file and compares the words in the file with a dictionary. Words that are not found in the dictionary may be marked in the text for later editing, corrected on the spot, skipped, or added to the dictionary. Words may be added to or deleted from the dictionary to create unique vocabularies for particular applications.

STYLOGRAPH for the Color Computer FLEX	195.00
STYLOGRAPH MAIL MERGE	125.00
STYLOGRAPH SPELLING CHECK	145.00
STANDARD FLEX Version	295.00



language listing, the program will bomb without necessarily giving any error message. *CSAVE* the program to cassette before running it. *RUN* the program. The BASIC listing disappears and *Minidos* is installed.

Minidos has sectioned your computer memory into two halves. If you have a 32K computer, you may now *CLOAD* in a 16K or less BASIC program. If you have a 16K computer, you may now *CLOAD* in an 8K or less BASIC program. Now *CLOAD* in one of your favorite BASIC programs. *LIST* your program or *RUN* it to make certain it is in memory. When you are satisfied your program is all right, type *EXEC* and press the *ENTER* button. Now try to list your program. It is gone! Don't worry. Your program is alive and well, safely tucked away in high user memory. Type in *EXEC* and *ENTER* again. *LIST* your program. It has returned safely.

Now the acid test. Save your program in high memory by typing *EXEC (ENTER)* once more. Next *CLOAD* in one more of your favorite programs. Check to make certain your program will *RUN*. Finally, type *EXEC (ENTER)* to make your newly entered program switch places with the other program tucked into high memory. Check to make certain the other program still will *RUN*. Great! Each time you type *EXEC*, your two programs will switch places and you may run either of them.

Minidos has some obvious limitations. First, only BASIC programs may be saved with *Minidos*. *Minidos* will not work with any of your machine language programs. Secondly, *Minidos* does not maintain a directory. There is no way for you to tell which program has been saved if you forget! *Minidos* will only save ONE extra program. Even if

you have plenty of memory space. Multiple saves are not permitted. Finally, once you've loaded *Minidos*, choose the *PCLEAR* that you want, but do not change it while using the program or you'll have problems.

Minidos has a big brother. I call it *VDOS*. *VDOS* is a complete Virtual Disk Operating System designed for 64K and 32K Color Computers. (By the way, any Color Computer can now be upgraded to 64K for as little as \$60. See *Rainbow* ads.) *VDOS* will save as many programs as will fit. *VDOS* will even save machine language programs. *VDOS* has a directory function which displays more information than even the normal Radio Shack Disk system. Implemented functions include, *Directory*, *Save A Basic Program*, *Save A Machine Program*, *Load A Basic Program*, *Load A Machine Program*, *Kill A Basic Program* and *Kill A Machine Program*. *VDOS* incorporates itself into your computer by giving you an extra command: You just type *VDOS* to get into *VDOS*. Unlike *Minidos*, it is permissible to change *PCLEAR* modes as often as you like with *VDOS*. Even pressing reset will not harm *VDOS*.

If you have a 64K computer, it is possible to save from 32K to 50K of programs, depending on where you tell *VDOS* to locate itself. All memory is dynamically allocated and reallocated. I have had as many as 25 short programs saved on *VDOS* at once. In any case, if you like *Minidos* but want more, see our ad in this month's *Rainbow*.

The listing:

320 0288
END ... 0555

```
10 ʹ MINIDOS - MINI VIRTUAL DISK
20 ʹ ALLOWS USER TO CLOAD UP TO
30 ʹ TWO OTHER BASIC PROGRAMS
40 ʹ AND SWITCH BACK AND FORTH
50 ʹ BETWEEN THEM.
60 ʹ
70 ʹ SEE RAINBOW ADVERTISEMENTS
80 ʹ FOR A COMPLETE VIRTUAL
90 ʹ DISK OPERATING SYSTEM
100 ʹ WHICH ALLOWS MULTIPLE
110 ʹ BASIC AND MACHINE LANGUAGE
120 ʹ PROGRAM STORAGE AND EVEN
130 ʹ MAINTAINS A DIRECTORY.
140 ʹ
150 PCLEAR 1
160 CLS 8
170 PRINT"STANDBY";
180 S1=&H21
190 S2=&H22
200 MX=PEEK(S1)*256+PEEK(S2)-25
210 RG=MX-1536
220 SP=INT(RG/2+1536)
230 CL=SP-1
240 READ CT
250 FOR X=SP TO SP+CT
260 READ PK
270 POKE X,PK
280 NEXT X
290 CLS
300 CLS 3
310 PRINT"ONLY ONE GRAPHICS PAGE
"
```

CO CO SERVICE

from

Creative Electronics Co.

64K Upgrades \$80.00 Installed
32k Upgrades \$30.00 Installed
Extended Basic W/Manual (Write)
Operating Light \$10.00 Installed
Video Interface \$20.00 Installed
Clock Boards \$80.00 Installed
Keyboards \$80.00 Installed
Roms Burned & Installed in
custom Rom Paks (Write)
We recommend C ITOH PROWRITER
printer and Panasonic monitor.
C ITOH Printer \$425.00+Shipping
Panasonic CT-1112 Color Mon. \$360+
shipping.
Fast turn around on all items.
Above prices apply to operating
D,E,F Boards & TDP Computers.
INCLUDE \$5.00 FOR RETURN SHIPPING
SEND S.A.S.E. FOR DETAILS AND FOR
FURTHER OFFERINGS.

CREATIVE ELECTRONICS Co.
4211-7th Ave.
Rock Island, Il.
61201

The Official

ZAXXON™

by SEGA®



The game that puts space games in perspective. Zaxxon™, one of the most popular arcade games of 1982, is now available for use with your home computer system.

Zaxxon™ technology and creativity present a 3-dimensional-like playfield which sets Zaxxon™ apart from other computer games.

Zaxxon™ looks and sounds like aircraft flight, and players can soar to new levels of

home computer entertainment. From the daring attack on the enemy's floating fortress and the blazing battle against the enemy's fighter fleet to the final showdown with the deadly armored robot, Zaxxon™ challenges the skill and imagination of every player at every level of skill.

Imagine yourself the pilot, attacking the enemy fortress—climbing, diving, strafing to score points and extra fuel. The enemy fights back with a barrage of missiles and gunfire. Then you face a fleet of enemy fighters in a gripping dogfight of altitude strategy and flying skill. Survive this battle and the enemy's fortress, defended with laser barriers, then you've earned the ultimate challenge; a blazing confrontation with the pow-

erful robot, armed with a lethal homing missile.

Zaxxon™ is the one game that you must see to believe. You have to play it to feel its impact. If you're ready to face the challenge, check with your local software dealer or send check or money order with \$2.00 postage/handling. California residents add 6½% sales tax. Available on cassette or diskette. Suggested retail price \$39.95.

Available in January on Atari®, February on Apple® and Radio Shack® Color, and April on TI 99/4A™ and NEC 6000™.

Datasoft Inc.®
COMPUTER SOFTWARE

9421 Winnetka Avenue
Chatsworth, CA 91311
(213) 701-5161
©1982 Datasoft® Inc.

Datasoft® is a registered trademark of Datasoft Inc.®

Sega® and Zaxxon™ are registered trademarks of Sega Enterprises Inc.


```

320 PRINT"HAS BEEN PCLEAR'D."
330 PRINT:PRINT"REMEMBER TO PCLE
AR MORE"
340 PRINT"IF DESIRED."
350 PRINT:PRINT:FOR X=1 TO 2000:
NEXT X
360 PRINT@480
370 PRINT"TYPE EXEC (ENTER)"
380 PRINT"TO SWITCH BETWEEN PROG
RAMS"
390 PRINT:PRINT:PRINT
400 X1=INT(SP/256)
410 X2=SP-X1*256
420 POKE 157,X1
430 POKE 158,X2
440 CLEAR 200,CL
450 NEW
460 DATA 137
470 DATA 166,141,0,129,38,20,48,
141,0,128,175,141,0,117,111,128,
111,128,108,141,0,111,175,141,0,
103,31,64,147,10,237,141,0,102,1
41,52,174,141,0,91,16,158,25,166
,164,230,132,167,128,231,160,16,
172,141,0,80,37,241,220,27,147,2
5,227,141,0,65,52,6,236
480 DATA 141,0,57,163,141,0,55,2
11,25,221,27,53,6,237,141,0,43,3
2,28,220,27,147,25,237,141,0,38,
236,141,0,29,163,141,0,27,16,163
,141,0,25,35,4,237,141,0,19,57,1
27,2,221,127,2,222,127,2,223,22,
0,0,57,251,255,255,255,0,0,0,251
,251

```

PRO-COLOR-FILE

If you're through playing games and are ready to get serious about software, then PRO-COLOR-FILE is for you. Turn your TRS-80 32K Color Computer Disk system into a powerful data base manager.

We're serious about PRO-COLOR-FILE. It's the only program of its kind that gives so much flexibility and power to your color disk at a price that will fit your budget. In fact, it could be the least expensive software you'll ever buy.

PRO-COLOR-FILE is not just one program. It gives you the ability to create any application that requires information to be stored, searched, updated, sorted and reported. You can custom design your own mailing list, inventory, stock investment records, time manager, expense records, income records . . . anything.

The best part about PRO-COLOR-FILE is that you don't have to be a programmer or even know a lot about disk input/output to use it. You design your application programs in a way that is easy for you to understand and use. In fact, the more you use PRO-COLOR-FILE the more you learn about data base development.

Only \$79.95 + \$2.00 Shipping and Handling.

We accept VISA, MASTERCHARGE, Checks or Money Orders. No C.O.D.'s please.

Call or write for more details:

DERRINGER SOFTWARE, Post Office Box 5300, Florence, S.C. 29502. Phone: (803) 665-5676 after 6:00 p.m. (EDT).

PRO-COLOR-FILE ©1983 Dennis Derringer.

*TRS-80 is a trademark of the Tandy Corp.

Home Interest Calculator: Quick, Accurate Assistance

Most families would find B.C. Engineering's *INTRSTI*, *Home Interest Calculator*, quite useful for their software library. It's not a fancy program, no buffer or printout capabilities. You simply input the pertinent information asked for on loans or money deposited in interest-bearing accounts. *Home Interest Calculator*, in turn, calculates the answer quickly and accurately.

It's a great little program for finding the difference in payments for a 20-year home loan as opposed to a 30-year loan. Or, finding the best financing for your next new car.

On the deposit side, it can help plan for Junior's college education or that vacation you dream about. Just input the needed amount of money, the interest rate on the account and the number of years in which to accumulate the money. Or, plan for your retirement. It will calculate the principal needed to receive a desired yearly payment.

The documentation is short and to the point. Quite easy to understand and use.

To the point, the program will do the following:

LOANS

- 1) Will calculate payment account,
- 2) Will calculate principal,
- 3) Will calculate balloon to loan payoff amounts,
- 4) Will calculate interest rate per period,
- 5) Will find interest rate charged per compound period,
- 6) Will find the number of payments that have to be made on a loan before the balance due is below the amount you enter.

DEPOSITS

- 1) Will calculate the final amount in an interest bearing account if a single payment is made to it,
- 2) Will calculate the single original amount that must be deposited to get the desired final amount,
- 3) Will calculate the final amount in an account after equal payments are made to it; payments are assumed yearly,
- 4) Will calculate the equal payments that can be received from a deposit; payments assumed yearly,
- 5) Will calculate the principal needed to receive a desired yearly payment,
- 6) Will calculate the equal payments needed to get the final amount desired; payments assumed yearly.

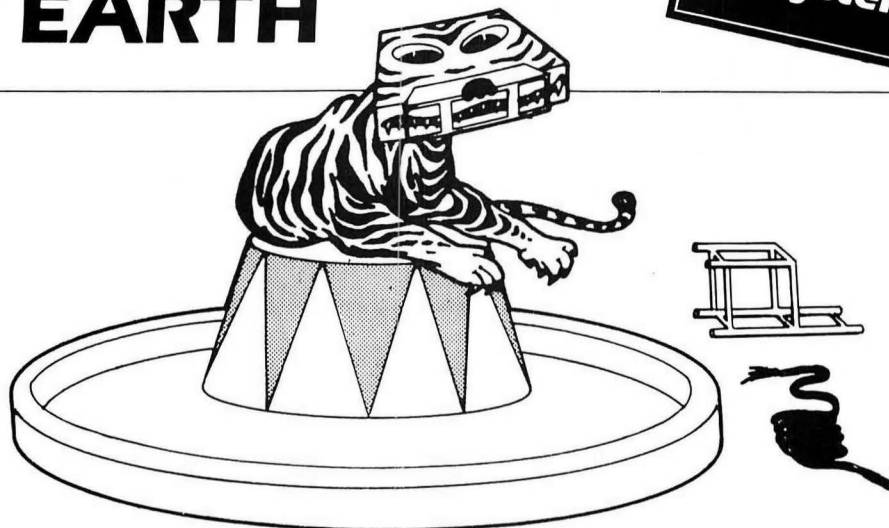
It may not be as easy to use a TI Business Analyst calculator, but it's somewhat cheaper, and it gives you an excuse to play with your CoCo.

(B.C. Engineering, P.O. Box 768, Manchester, MO 63011, \$12.95)

— Pamela Peitsch

THE GREATEST SOFTWARE DEAL ON EARTH

Radio Shack
Color Computer
TDP
System 100



Tame your computer without breaking your wallet's spirit! Quality programs on tape for the price of peanuts!

A subscription to **Chromasette Magazine** consists of 6 to 8 ready-to-load useful, practical, and fun programs delivered by First Class Mail every month. Programs like Curve Fit, Diggem, Graph Text, List Mod, Robot Run, House Adventure, and Keep Text.

Treat yourself to a great show — get a subscription to **Chromasette Magazine**. Or catch a single act and try a back issue. You'll be delighted by the tricks your computer will do!

The Bottom Line:	1 year (12 issues)	\$50.00	Calif. residents add 6% to single copies. North America — First Class postage included. Overseas — add \$10 to subscriptions and \$1 to single copies. Sent AO rate.
	6 months		
	(6 issues)	\$30.00	
	Single Copies	\$ 6.00	

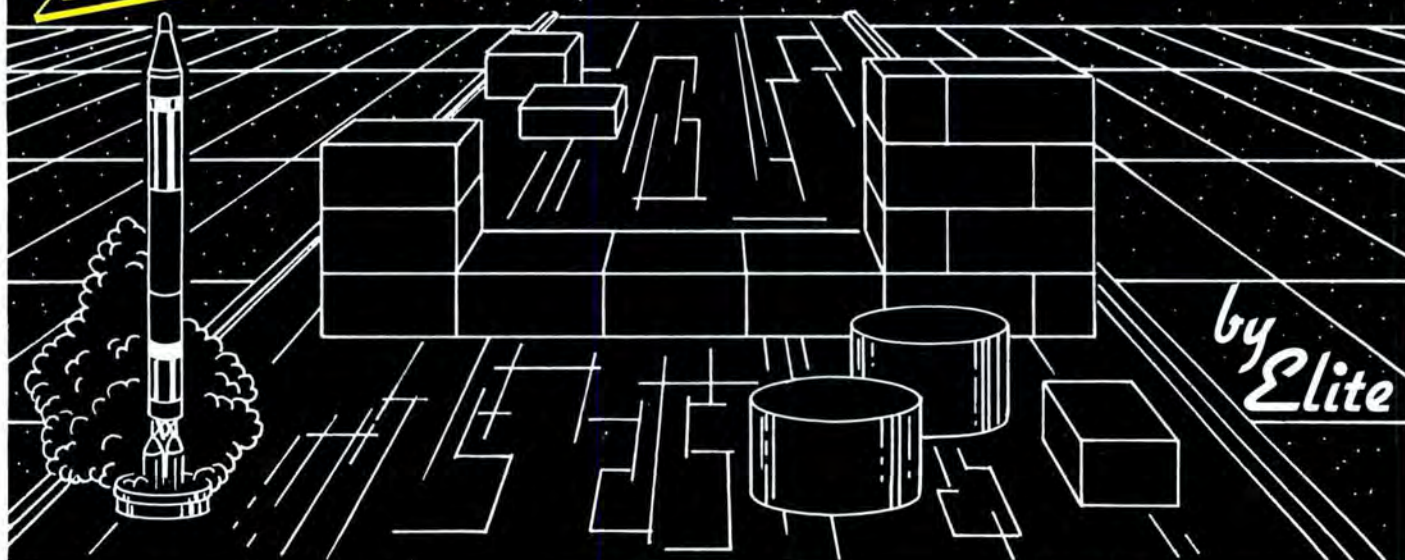
The Fine Print: All issues from July 1981 available — ask for list. Programs are for the Extended BASIC model and occasionally for disks.



Chromasette MAGAZINE

P.O. Box 1087 Santa Barbara, CA 93102 (805) 963-1066 MasterCard/Visa

ZAKSUND



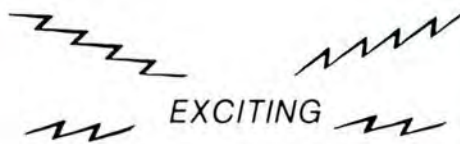
Fly your spaceship through enemy Starbases. Avoid guided missiles, lasers, and firing turrets! Can you reach their leader . . . ZAKSUND?

★ 3-D ★

COLOR GRAPHICS

... the creators of
 - Intergalactic Force¹
 - War Kings²
 - Party Pak¹
 - Trek-16²
 - many other fine programs!

¹ ANTECO
² TOM MIX



Elite Software

Box 11224
 Pittsburgh, PA 15238
 (412) 795-8492

\$24.95 Cassette

\$27.95 Disk

Add \$1 Postage and Handling
 PA residents add 6% sales tax

ARCADÉ ★ ACTION
 32K
 MACHINE LANGUAGE

Here's A 120 Frame 'Graphics Pad' For easy Animation

By Scott L. Bain

Those interested in computer animation would do well to choose the Color Computer. TRS-80C Extended BASIC supports a wide range of extremely user-friendly graphics commands and allows for page switching, making simple, smooth looking animation a relatively easy task. But those who want to create lengthy, animated artwork without resorting to tedious *DRAW* commands and slow graphics updates will need more than eight pages to work with.

Animator is a full function "graphics pad" program that divides each of five graphics pages into 24 miniframes. The user is provided with a cursor controlled drawing board, a window to the area where the individual "frames" are stored, the ability to animate using any or all of the 120 frames, commands to edit and duplicate existing frames, and a subroutine to save finished frames to tape.

Displays

The main display is divided into two smaller displays, outlined by white boxes. The display on the left is the user "pad"—the flashing cursor there is moved using the arrow keys and I, 2, W, and Q (for diagonals), and wraps around in all four directions. Move (M), Draw (D), Erase (E), Paint (P), Line (L), Circle (C), and Box (B) are fully supported in black and white. The display on the right is a window to the current frame position on the storage pages. "F" will advance this position one frame and "R" will move it back one. Pressing the "clear" key will display the storage page currently occupied by the frame cursor (the long white line). There are five storage pages, and repeated use of the "clear" key will allow you to flip through them (see point 5 under "other notes"). "F" and "R" will still work (try them) and "G" will advance the frame cursor one full page.

"#" will clear the user pad. "*" will clear the storage pages and since on powerup the 80C's graphics pages are filled with random "garbage," it is important to clear them first.

Storing and Animating Frames

Using "D," put the cursor into *DRAW* mode, then using the arrow keys and I, 2, W, and Q draw something on the pad. When you are finished press "S." The right screen (window) should now contain an exact copy of what you just drew, and when you press "clear" you will notice that the storage page has a copy of your figure in the upper left hand corner (this is what the window is "looking at"). Press "F" once—don't hold it down as it will auto repeat—and the frame cursor will advance to the next position. Press the space bar to get back to the main display and you will notice the window is now blank. The window always displays the same frame as the frame cursor is underlining, and vice versa.

Using the pad cursor controls, add something to the drawing you just made (it is still on the pad, you'll note), and press

"S" again. This new version of the drawing will be copied into storage at the new frame cursor/window position. Press "clear" and you will see how the two frames are stored.

Press "A" and the two frame animation will begin. Use the "-" key to slow it down and "+" to speed it back up again. Pressing the space bar will stop it completely.

NOTE: *Animator's* "A" command flips through the stored frames, one by one, starting with the first frame and ending with the frame currently underlined by the frame cursor and displayed in the window. This means that if you have stored 50 frames but have left the frame cursor on #5, only frames 1 through 5 will be included in the animation procedure. Use "G" and "F" to advance the frame cursor to the last frame position.

Specialty Drawing Commands

Animator's specialty commands make it easy to draw standard figures and erase them. Press "M" to get the pad cursor into "move" mode, and "#" and "*" to clear everything out. Press "" (shift 7) and a single pixel will be set at the current cursor position, accompanied by a "beep." Move the cursor away, preferably toward a corner. This dot you have left behind is the "endpoint dot" used by the specialty commands. Press "C" and a circle will be drawn using the endpoint dot as the center and the cursor as a point on the circumference. "X," which is just to the left of "C" will erase the circle if you have not moved the cursor. "B" (erased by "V") and "L" (erased by "K") will yield interesting results. Try them. Pressing "" again will create a new endpoint dot, although the old one will not be erased from the pad.

Paint (P) works just like it does in Extended BASIC, and is mainly intended to be used to fill in closed polygons. "O" does the same thing in black, and therefore can be used as an eraser.

Editing and the "&" Command

Once your animation is finished you may want to change or add to it. This is easily done:

To change an existing frame, merely move the frame cursor/window to the desired position. "T" will transfer (copy) the frame to the pad, wiping out anything that was there. You can now use the pad controls to alter the frame, or you can clear it out and draw something totally new. Either way, "S" will replace the stored frame with whatever is on the pad.

Note that this will completely wipe out the old frame and insert the new in its place.

The "&" command will work exactly the same way except that the pad frame will be added on top of the existing frame, thus combining the two. This can be most useful in complex animations. Programmers should note that the *OR* option of the *PUT* command is at work here.

There is no edit "mode" because (in effect) you are always

editing. When creating animation at first, you are actually editing out blank frames and replacing them with filled ones. The commands are always the same.

Command Summary

PAD

- D** Puts the cursor into "draw" mode. The cursor will leave a white trail behind it as it moves.
- E** Puts the cursor into "erase" mode. The cursor will erase (reset) any pixel it moves through.
- M** Puts the cursor into "move" mode. The cursor will move through drawings without disturbing them. NOTE: "." will set a single pixel while in this mode, and "," will reset one.
- #** Will clear the pad to black.
- shift 7** Will set the endpoint dot.
- C** Draws a circle using the endpoint dot as the center and the current cursor position as a point on the circumference. "X" erases it.
- B** Draws a box using the endpoint dot and current cursor position as the corners. "V" erases it.
- L** Draws a line using the endpoint dot and current cursor position as the endpoints. "K" erases it.

- P** Paints the screen white, stopping at white borders. "O" does the same thing in black. (The arrow keys and I 2 W Q control the movement of the cursor. They will auto repeat, and wrap around.)

WINDOW/FRAME CURSOR

- F** Moves position one frame forward. Beeps when last frame reached.
- R** Moves position one frame back.
- G** Moves position one full page forward, wraps around page 5 to 1.
- N** Returns position to frame #1, page #1.
- clear** Display current page.
- space** Return to main display.
- *** Clear all storage.

TRANSFER/EDIT

- S** Save pad frame to current storage position.
- T** Transfer frame at current position to pad for editing, etc. ("S" returns frame to storage)
- &** As "S," but with OR option. Adds the pad frame to whatever is stored at the current position.

- @** Locks the "F" command on. Every time the "S" key is pressed thereafter, the pad frame will be stored and the frame position automatically advanced as if "F" had subsequently been pressed. A beep will sound each time, reminding you that the lock is still on. Pressing "@" again will turn the lock off.

ANIMATING

- A** Animate from frame #1, page #1, up to and including the frame displayed in the window (and underlined by the frame cursor).
- space** Stop animating.
- Slow down the animation.
- +** Speed up the animation (begins at full speed)

Saving to Tape

Once an animation is finished, make sure the frame cursor is on the last frame you want stored, then press "/" Use the "Save" option to create a machine language file that should be approximately four tape counts per page saved long, under any name you like, up to eight characters in length.

To load a finished animation back into the program, make sure the storage is clear ("*") then press "/" After the file is loaded, note *the frame cursor must be advanced to the last frame of the animation before using the animate "A" command.* Using the "/" option always returns the frame cursor to the #1 frame. If you press "A" while it's still there, you end up looking at a one frame animation!

Hyperion Software
presents

TREKBEST
The BEST 'Trek' game ever!!!
INTRUDER ALERT!
Can YOU outsmart the Robots???

=====

Both games with multiple levels, and
Realtime, Fast Action lowres graphics!
Each for only \$16.95

=====

-- The BEST in Adventures --
** THE NECROLOGUE TRILOGY **
A Three program Adventure!!!
All Three 16k programs.....
for only \$17.95

THE QUEST FOR THE STAFF OF LLORINAR
*** Book I Parts 1&2 ***
Both parts (2 16k programs) for 13.95
(Parts 3&4 coming soon!)

=====

All prices include P. & H. NY State
residents please add app. sales tax.
HYPERION SOFTWARE
P.O. Box 196
Lagrangeville, NY 12540

Other Notes

1) Don't worry if you need to "break." The program will never clear out the storage unless you tell it to ("**"). Whatever was on the pad will be lost, though, unless you take the *PCLS* out of line 12 before running.

2) Erasing a line using "L" or a box using "V" will also erase the endpoint dot. Don't be fooled—the endpoint is still the same until you change it by pressing "" (shift 7) again.

3) Copying a frame from one point of the animation to another is simple. Just move the frame position to the desired frame, transfer ("T") it to the pad (it won't be wiped out of storage, just copied onto the pad), then move the frame position to the new location and save ("S") it. You can duplicate any frame any number of times using this method.

4) The number of dots in the upper left hand corner of the main display indicates which page of the frame cursor it's currently on (each page holds 24 frames, remember).

5) Repeated use of the "clear" key will flip you through the pages in rotation. "G" will actually move the frame cursor position through the pages. If you use "clear" to view a page other than the one currently occupied by the frame cursor, then try to move the frame cursor using "F," "R," or "G," the commands will still function, but you will be flipped back to the current page first.

6) Only those commands listed under "Window/Frame Cursor" in the command summary will function while you are viewing the storage page(s). If you press any other command key you will be returned to the main display before the command is executed. All commands except "-" and "+" may be used while viewing the main display. ("- and "+" are only used during animation—there's no reason to use them any other time.).

7) The following keys will auto repeat: the arrows, 1, 2, W, Q, F, R, G, +, and -.

8) Black on white drawing is possible by painting ("P") the screen white, then drawing in black using the erase commands. Note that "&" will not work properly using this method.

9) If your computer cannot use the standard processor speed up, you should remove the *POKE 65495,0* from lines 12 and 19 and the *POKE 65494,0* from line 19.

10) After first loading *Animator* from tape you must *PCLEAR 6* before it will *RUN*. I have no idea why, but *RUNning* twice will also work. I believe it's a quirk in the ROM.

11) This program is dedicated to Andrea R. Chartier, without whom this entire project would never have come to be.

(Scott Bain is a free-lance software author and journalist who works out of San Diego. He and his partner, Andrea Chartier, own and operate Scan Software Designs.)

23	.....	039D
40	.....	060F
54	.....	084B
75	.....	0AC9
93	.....	0D18
108	.....	0F49
END	...	1181

The listing:

```
10 PCLEAR6
11 CLEAR15: DIMM(11, 11): DLAY=1: VP
```

PRISM



ARCADE GAMES

Dealer inquiries welcome
Quality color computer software
All Software on tape only
All games require 16 K except where noted

★ By Spectral Associates ★

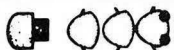
GHOST GOBLER	\$26.95	ROBOT BATTLE	\$26.95
ALCATRAZ II	\$11.95	PLANET INVASION	\$26.95
GALAX ATTAX	\$26.95	COSMIC INVADERS	\$26.95
SPACE WAR	\$26.95	SPACE RACE	\$26.95
KEYS OF THE WIZARD	\$23.95	DEFENSE	\$26.95

★ By Mark Data Products ★

BLACK SANCTUM	\$28.95	ASTRO-BLAST	\$30.95
CAVE HUNTER	\$28.95	CALIXTO ISLAND	\$28.95
BERSERK	\$30.95	SPACE RAIDERS	\$30.95

★ By Computerware ★

COLOR PAC ATTACK	\$30.95	STARSHIP	
DOODLEBUG	\$30.95	CHAMELEON	\$30.95
RAIL RUNNER	\$30.95	STORM	\$30.95



★ By Intracolor ★

COLORPEDE	\$35.95
-----------	---------

★ By Tom Mix Software ★

DONKEY KING	\$30.95
-------------	---------



requires 32 K

Prism Software

CHOPPER RESCUE	(Extended BASIC)	\$13.95
LAS VEGAS	(Extended BASIC)	\$11.95
THE ALIEN		\$13.95

RAIDERS "By Prism Software" In this adventure you must deal with voodoo curses, alligators, ancient traps and hostile natives. This adventure begins in the confusion of a large city and ends (maybe too soon if you're not careful) in a dangerous, dense jungle in South America.
(Extended BASIC) \$16.95



Prism Software

779 Queen St.,
Box 1360, Kincardine,
Ontario, Canada. N0G 2G0
Tel: (519) 396-8224

Add 5% for shipping
No C.O.D.
VISA or Mastercard accepted
Ontario residents add 7% sales tax.

Please allow
2-3 weeks for delivery


```

AGE=2:LOCK=0:OX=64:OY=99:X=OX:Y=
OY:PIXEL=0:PDRAW=2:BX=1:BY=1
12 PMODE0,1:PCLS:CLS:SCREEN1,1:L
INE(42,77)-(86,121),PSET,B:LINE(
170,77)-(214,121),PSET,B:GOSUB10
2:POKE65495,0
13 PMODE0,VPAGE:LINE(BX,BY+42)-(
BX+40,BY+42),PSET:PMODE 0,1
14 FORI=2TOVPAGE
15 PSET(I*4,10,5):NEXTI
16 A$=INKEY$:PSET(X,Y,5)
17 FORT=1TO5:NEXTT:PRESET(X,Y)
18 IFA$="D"THEN PDRAW=1:PSET(X,Y
,5):GOTO14
19 IFA$="/"THENPOKE65494,0:GOSUB
114:GOSUB102:RUN
20 IFA$="B"THEN LINE(OX,OY)-(X,Y
),PSET,B:PSET(X,Y,5):PIXEL=1
21 IFA$="V"THENLINE(OX,OY)-(X,Y)
,PRESET,B:PRESET(X,Y):PIXEL=0
22 IFA$="N"THEN PMODE 0,VPAGE:LI
NE(BX,BY+42)-(BX+40,BY+42),PRESE
T:PMODE 0,1:LINE(1,10)-(40,10),P
RESET:BX=1:BY=1:VPAGE=2:GOSUB 10
2:GOTO 14
23 IFA$<>"@"THEN25
24 IFLOCK=1THENLOCK=0:SOUND100,2
:ELSELOCK=1:SOUND100,2

```

```

25 IFA$="E"THENPDRAW=0:PRESET(X,
Y):A$=","
26 IFA$="L"THENLINE(OX,OY)-(X,Y)
,PSET:PSET(X,Y,5):PIXEL=1
27 IFA$="K"THENLINE(OX,OY)-(X,Y)
,PRESET:PRESET(X,Y):PIXEL=0
28 IF A$=""THEN SOUND 200,1:OX=
X:OY=Y:A$="."
29 IFA$="."THENPSET(X,Y,5):PIXEL
=1:GOTO 14
30 IFA$=","THENPRESET(X,Y):PIXEL
=0:GOTO 14
31 IFA$="M"THENPDRAW=2:GOTO14
32 IFA$="S"THENGOSUB68:IFLOCK=1T
HEN A$="F":SOUND100,2:ELSEGOTO14
33 IFA$="&"THENGOSUB68:IFLOCK=1T
HEN A$="F":SOUND100,2:ELSEGOTO14
34 IFA$="A"THENGOSUB74:GOTO16
35 IFA$="#"THENPIXEL=0:GOTO12
36 IFA$="*"THENGOSUB86:GOTO13
37 IF A$="T"THEN GET(172,79)-(21
2,119),M,G:PUT(44,79)-(84,119),M
,PSET:IFPPOINT(X,Y)=0THEN PIXEL=
0 ELSE PIXEL=1
38 IFA$=CHR$(12)THEN GOSUB90:GOT
O17
39 IFA$="F" THEN GOSUB98:GOTO14
40 IFA$="R"THEN GOSUB104:GOTO14
41 IFA$="P"THEN PAINT(X,Y),5,5:P
SET(X,Y,5):PIXEL=1
42 IFA$="C"THEN CIRCLE(OX,OY),SQ
R(ABS(X-OX)^2+ABS(Y-OY)^2):PSET(
X,Y,5):PIXEL=1:GOTO 14
43 IFA$="X"THEN CIRCLE(OX,OY),SQ
R(ABS(X-OX)^2+ABS(Y-OY)^2),0:LIN
E(42,77)-(86,121),PSET,B:PRESET(
X,Y):PIXEL=0:GOTO 14
44 IFA$="O"THEN PSET(X,Y,5):PAIN
T(X,Y),0,0:LINE(42,77)-(86,121),
PSET,B:PRESET(X,Y):PIXEL=0:
45 IFA$="G"THEN GOSUB123
46 IFCHR$(94)=A$THEN Y1=Y-2:X1=X
:GOTO55
47 IFCHR$(9)=A$THEN X1=X+2:Y1=Y:
GOTO55
48 IF CHR$(10)=A$ THEN Y1=Y+2:X1
=X:GOTO 55
49 IF CHR$(8)=A$ THEN X1=X-2:Y1=
Y:GOTO 55
50 IF A$="1" THEN X1=X-2:Y1=Y-2:
GOTO 55
51 IFA$="2"THEN X1=X+2:Y1=Y-2:GO
TO55
52 IFA$="W"THEN X1=X+2:Y1=Y+2:GO
TO55
53 IFA$="Q"THEN X1=X-2:Y1=Y+2:GO
TO55
54 GOTO 14
55 IF X1 < 44 THEN X1=X1+42
56 IFY1<79THEN Y1=Y1+42

```

UPLOAD \$16.95

This is the UPLOAD side of DLOAD and DLOADM in Extended Color Basic. Send a basic or machine program to another ECB Color Computer. Programs can be passed directly or by phone if both computers are hooked to modems.(not supplied). Uploaded program arrives at the receiving end ready to save, run, or execute. Patch to correct the flaw in DLOADM is supplied in public domain.

INDEXER \$14.95

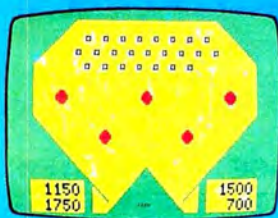
Program produces a sorted list of variables and line numbers used in your basic program. Following each variable or line number will be a listing of the numbers of the basic lines which contain the variable or line number. RUNNING the basic program is not required. Bonus! Global search of basic program for a variable, a text string, or a basic keyword.

Fast machine language

16K/32K EXTENDED BASIC, Tape or RS Disk
Add \$2.00 for shipping and handling

ML-US'R SOFTWARE
115 RISING SUN, Dept R
FORT MITCHELL, KY 41017

Radio Shack TRS-80® Color Computer Software Sale!



Pinball

Save \$7⁰⁷

22⁸⁸ Reg. 29.95
26-3052

Be a pinball wizard! Hit the circle poppers and knock-outs for points. You can even bump and tilt. For faster play, design your own customized playfield.



Art Gallery

Save \$10⁰⁷

29⁸⁸ Reg. 39.95
26-3061

Create landscapes, still lifes, cartoons—whatever suits your artistic fancy! Special graphics features let you accurately control your drawing.

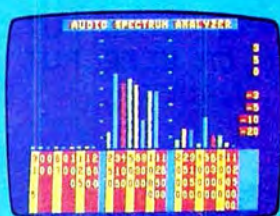


Microbes

Save \$5⁰⁷

19⁸⁸ Reg. 24.95
26-3085

You're the disinfectant shooting antibodies at the nasty bacteria. Watch out for "X factor". This sneaky enemy can zap you with its own antibodies!



Audio Spectrum Analyzer

New Low Price!

14⁹⁵ Was 19.95
In Cat. RSC-8
26-3156

Test your stereo equipment for maximum performance! Color bar graphs show the power distribution over nine full octaves in 1/3 octave segments.



Wildcatting

Save \$10⁰⁷

19⁸⁸ Reg. 29.95
26-3067

One to four wheeler-dealers pick drilling sites and fight for the highest profits. Hit a gusher and you're in the money. But tap a dry hole and you're drained!



Roman Checkers

Save \$5⁰⁷

24⁸⁸ Reg. 29.95
26-3071

The classic game of strategic placement—as easy to learn as checkers, but as rewarding as chess. Play against the computer at different skill levels.



Tennis

Save \$10⁰⁷

19⁸⁸ Reg. 29.95
26-3080

Test your tennis skill against a real pro—your Color Computer! Or play another person. Realistic matches demand quick reflexes and concentration.



Shooting Gallery

Save \$5⁰⁷

24⁸⁸ Reg. 29.95
26-3088

The carnival beckons—lights, music, the shooting gallery! Hit moving targets—owls, ducks and more—for points. Fewer shots each turn.

Radio Shack®

The biggest name in little computers®

A DIVISION OF TANDY CORPORATION

Retail prices may vary at individual stores and dealers.


```

57 IFX1>84THEN X1=X1-42
58 IFY1>119THEN Y1=Y1-42
59 IFPDRAW=1THEN PIXEL=1
60 IF PDRAW=0 THEN PIXEL=0
61 ONPIXEL+1GOTO62,63
62 PRESET(X,Y):GOTO 64
63 PSET(X,Y,5)
64 IF PDRAW=1 THEN PSET(X1,Y1,5)
  ELSE IF PDRAW =0 THEN PRESET(X1
,Y1)
65 IF PPOINT(X1,Y1)<>0 THEN PIXE
L =1 ELSE PIXEL =0
66 X=X1:Y=Y1:GOSUB 67:GOTO 14
67 FOR N=338 TO 345:POKE N,255:N
EXT N:RETURN
68 IFPDRAW=1ORPIXEL=1THEN PSET(X
,Y,5)
69 GET(44,79)-(84,119),M,G
70 PMODE 0,VPAGE
71 IF A$="&" THEN PUT(BX,BY)-(BX
+40,BY+40),M,OR ELSE PUT (BX,BY)
-(BX+40,BY+40),M,PSET
72 PMODE 0,1: IF A$="&" THEN PUT
(172,79)-(212,119),M,OR ELSE PUT
(172,79)-(212,119),M,PSET
73 RETURN
74 FORPAGE=2TOVPAGE
75 IF PAGE<>VPAGE THEN FOR I=1 T
O 161 STEP 44:FOR J=1 TO 241 STE
P 42:GOTO 78

```

```

76 FOR I=1 TO BY STEP 44
77 IF I=BY THEN FOR J=1 TO BX ST
EP 42 ELSE FOR J=1 TO 246 STEP 4
2
78 PMODE 0,PAGE
79 GET(J,I)-(J+40,I+40),M,G:PMOD
E0,1
80 PUT(44,79)-(84,119),M,PSET
81 FORD=1TODLAY:NEXT D
82 A$=INKEY$:IF A$="" THEN 84 EL
SE IF A$="-" OR A$="+" THEN GOSU
B 87:GOTO 84
83 RETURN
84 NEXT J,I,PAGE
85 GOTO74
86 BX=1:BY=1:FOR PAGE =2 TO 6:PM
ODE 0,PAGE:PCLS:NEXT PAGE:PMODE0
,1:LINE(1,10)-(40,10),PRESET:LIN
E(173,79)-(212,118),PRESET,BF:VP
AGE=2:RETURN
87 IF A$="+" THEN DLAY=DLAY-10:I
F DLAY<1 THEN DLAY=1
88 IF A$="-" THEN DLAY=DLAY+10:I
F DLAY>190 THEN DLAY=190
89 SOUND200-D,1:GOSUB67:RETURN
90 CPAGE=VPAGE
91 PMODE0,CPAGE:SCREEN1,1
92 A$=INKEY$:IF A$="" THEN 92
93 IF A$=CHR$(12) THEN CPAGE=CPA
GE+1:IF CPAGE=7 THEN CPAGE=2:GOT

```

Find The
COLOR COMPUTER INFORMATION
 YOU NEED
COLOR COMPUTER INDEX 
COLOR COMPUTER CATALOG 

American Library and Information Services
 Dept. R, 3705 Mary Ellen NE, Albuquerque, NM 87111

Gentlemen:

- Yes! Send me **COLOR COMPUTER INDEX 1980-1981** at \$5 (Canada and Mexico \$6)
- Yes! Sign me up for **COLOR COMPUTER INDEX 1982** (4 issues) for \$16 (Canada and Mexico \$20)
- Yes! Sign me up for **COLOR COMPUTER CATALOG 1982** (two issues) for \$20 (Canada and Mexico \$24)
- YES!** Sign me up for **Color Computer Index 1983** (Six issues for \$24—Canada & Mexico \$30)
- YES!** Sign me up for **Color Computer Index 1983** (Two issues for \$20—Canada & Mexico \$24)

Single Issues:

Color Computer Index \$6 U.S. (Except 1980-1981)
Color Computer Catalog \$12 U.S.

Name _____
 Address _____
 City _____ State _____ Zip _____


```

0 91 ELSE GOTO 91
94 IF A$="G" THEN GOSUB 123:GOTO
90
95 IF A$="F" THEN GOSUB 98:GOTO
90
96 IF A$="R" THEN GOSUB 104:GOTO
90
97 PMODE0,1:SCREEN1,1:RETURN
98 PMODE0,VPAGE:LINE(BX,BY+42)-(
BX+40,BY+42),PRESET:PMODE0,1
99 BX=BX+42:IFBX<241 THEN 102
100 IFBY+44>161 AND VPAGE=6 THEN
SOUND200,10:BX=BX-42:GOTO102
101 IF BY+44>161 THEN VPAGE=VPAG
E+1:BX=1:BY=1 ELSE BY=BY+44:BX=1
102 PMODE 0,VPAGE: GET (BX,BY)-(
BX+40,BY+40),M,G:LINE(BX,BY+42)-
(BX+40,BY+42),PSET:PMODE 0,1:PUT
(172,79)-(212,119),M,PSET
103 GOSUB 67:RETURN
104 IF BX<>1 OR BY<>1 THEN 108
105 IF VPAGE=2 THEN RETURN
106 PMODE 0,VPAGE:LINE(BX,BY+42)
-(BX+40,BY+42),PRESET
107 PMODE 0,1:PRESET(VPAGE*4,10)
:VPAGE=VPAGE-1:BX=211:BY=133:PMO
DE 0,VPAGE:GOTO 112
108 PMODE0,VPAGE

```

```

109 LINE(BX,BY+42)-(BX+40,BY+42)
,PRESET
110 BX=BX-42:IFBX>=1 THEN 112
111 BX=211:BY=BY-44
112 LINE(BX,BY+42)-(BX+40,BY+42)
,PSET
113 GET(BX,BY)-(BX+40,BY+40),M,G
:PMODE 0,1:PUT(172,79)-(212,119)
,M,PSET:GOSUB67:RETURN
114 CLS:INPUT"SAVE OR LOAD";T$:T
$=LEFT$(T$,1):IFT$=""THEN122
115 CLS:INPUT"FILE NAME";F$:IFLE
N(F$)>8 THEN 115
116 PRINT"READY TAPE AND HIT 'EN
TER'":LINEINPUTA$
117 PMODE 0,2:SCREEN 1,1
118 IF T$="S" THEN 120
119 CLOADM F$:GOTO 122
120 PMODE 0,VPAGE:LINE (BX,BY+42)
-(BX+40,BY+42),PRESET:PMODE 0,2
121 CSAVEM F$,3072,1535+(VPAGE*1
536),44553
122 PMODE 0,1:SCREEN 1,1:RETURN
123 PMODE0,VPAGE:LINE(BX,BY+42)-
(BX+40,BY+42),PRESET:VPAGE=VPAGE
+1:IFVPAGE>6 THEN VPAGE=2:PMODE0
,1:LINE(1,10)-(40,10),PRESET
124 GOTO102

```

FILMASTR

A powerful DATA MANAGEMENT SYSTEM for the COLOR COMPUTER. If you have been wanting a really good data manager at a reasonable price, **THIS IS IT!** FILMASTR combines the best features of the big systems to provide a combination of speed, power, and simplicity that can't be beat.

CUSTOM SCREENS - Design input screens with up to 20 fields. Inverse labels for contrast.

FORM FILL ENTRY - Non-destructive blinking cursor, full screen editing, no garbage collections, copy fields from previous record. Keeps up with the fastest typist.

FAST SORT & SEARCH - Machine language sorts the entire file in seconds. Sort on any field or fields. Use a variety of relational search techniques to select any record or group of records that you can define.

EDIT FILES - Change or delete any record easily. Create and save sub-files or append files.

PRINT FORMAT - Print any field in any order on any line. Insert characters or phrases.

MENU DRIVEN - No special commands to be learned. All functions are menu selected and aided by on screen instructions.

CAPACITY - Up to 255 characters per record, 24000 characters per file. (9000 with 16K)

DOCUMENTATION - A thorough manual with examples and explanation of every command.

FILMASTR 16K or 32K..... TAPE \$29.95
EXT BASIC DISC 34.95

TIME & MONEY

A "WHAT IF?" financial planning tool. T & M is used to evaluate the time value of money as an aid in planning investments, savings plans, retirement plans, leases, loans, mortgages or any other situations that involve compound interest.

The program is menu driven with simple on-screen instructions. It uses a unique form fill-in for data entry with easy editing. It even accepts simple math expressions as input.

Calculated results are automatically entered as data and can be used for further "WHAT IF?" calculation. All factors are always on screen, making it easy to understand the relationship between **TIME & MONEY**.

TIME & MONEY 16K or 32K TAPE \$19.95
EXT BASIC DISC 24.95

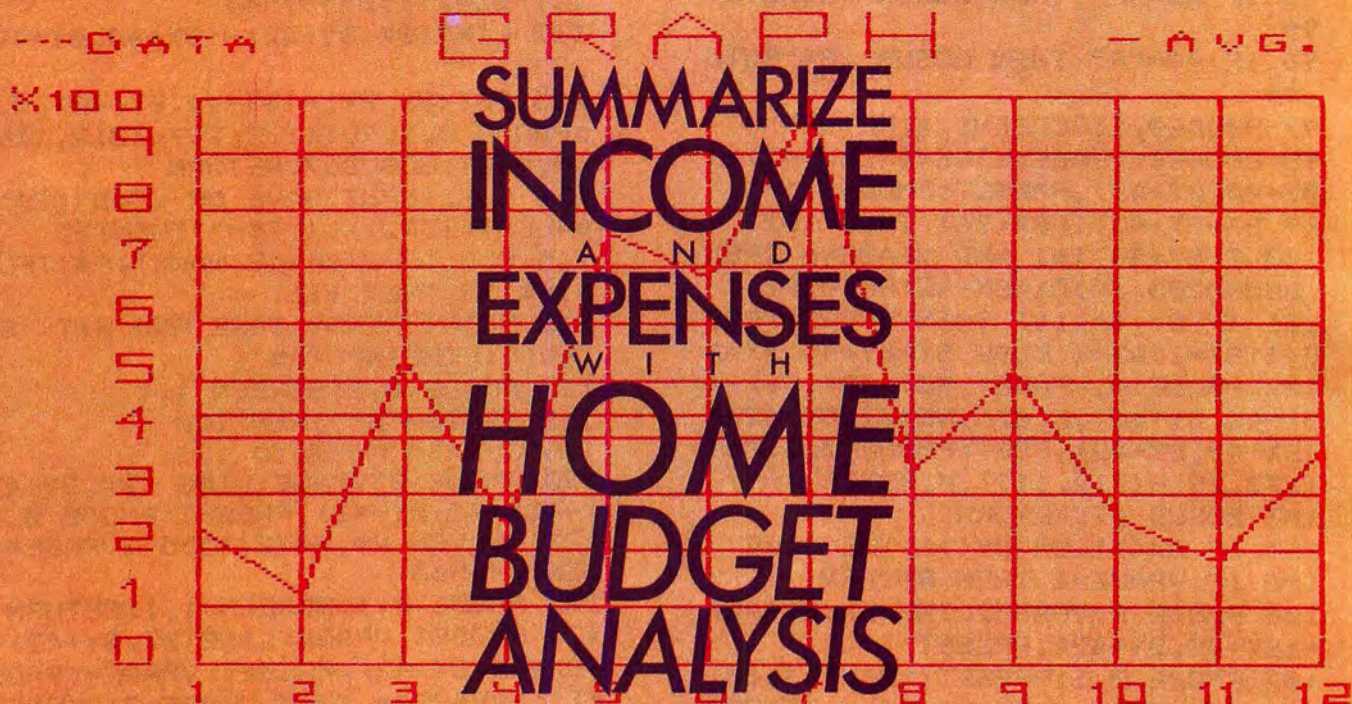
THE
COMPUTER
HOUSE

(814) 371-4658

BOX 1051, DUBOIS PA, 15801



Add \$2.00 Postage & Handling
PA Residents Add 6% Tax
C.O.D. \$2.00 Additional



BY J. D. RAY

Home Budget Analysis was developed for my use in summarizing year-end income and expense information for my household budget. This is the kind of program I like to use with my Color Computer because it demonstrates its extreme versatility. In the process of closing out our household finances for 1982, I wanted to be able to compare more visually certain categories and see how much was spent on a month-by-month basis. I use the *Personal Finance* program ROM pak developed by Tandy and its biggest flaw is not being able to print out data with a printer and demonstrate visually what is happening in the various categories.

This program fills that void by allowing you to enter the compiled information from the *Personal Finance* program and send the information to a printer. Then you have the option to see this data displayed on a high-resolution graph. The program not only gives you a month-by-month summary, but a year-end total and an average for the year. Please note that you do not have to use the *Personal Finance* program to compile information. Any process you use to compile your home finances can be used to determine data for this program.

The best part of all of this is the program's ability to graph the information on a high-resolution graph. The grid is drawn with line statements and labeled with alpha-numeric. Then

COLOR COMPUTER | FLEX* | OS-9† USERS

DO YOU WANT faster running programs (over 100 times faster than BASIC)? A high level language that is also a low level language? A compiler that runs in less than 32K? Assembly language output? Position independent code? Extensive library functions in source assembly code? Periodic newsletters with new library functions? An aid in learning assembly language? Liberal version updates?

C is the language of the eighties; accepted by IBM and Bell Labs for system development: a compact, highly versatile, easy to use language, excellent to use to build games, applications, utilities, operating systems, etc.

DUGGER'S GROWING SYSTEMS with over 21 years of experience in computing was first on the market with a 6809 C compiler. The compiler has been extensively tested, revised, and proven.

DUGGER'S GROWING SYSTEMS C is a growing subset of the standard C. Version 1 contains all the necessary C commands (while, if, if else, int, char, etc.). Version 2 contains additional features (float, long, for, goto, etc.).

AN EXTENSIVE LIBRARY in assembly language source is provided (char, I/O, formatted print, filehandling, string manipulating, etc.) Color Computer version also has additional functions which use the BASIC ROM

functions (cls, polcat, floating point, etc.).

ORDER NOW (new low prices)

Color Computer C Compiler
Version 1.2 (disk version) . . \$49.95
Flex C Compiler
Version 2.3 120.00
OS-9 C Compiler
Version 1.2 95.00
C Programming Language
by Kernighan & Ritchie
(a must) 19.95
Computerware
disk assembler 49.95
Computerware Scribe
(Disk editor-text formatter) . 49.95
Shipping add \$3.00
C.O.D. and Foreign handling
add 15%

MasterCard and Visa accepted.

 **DUGGER'S GROWING SYSTEMS**

Post Office Box 305 • Solana Beach
California 92075 • (619) 755-4373

DEALER INQUIRIES INVITED

Move up to **C** language compiler

*OS-9 is a trademark of Microware, Inc.
†FLEX is a trademark of Technical Systems Consultants, Inc.

the data is plotted. Not only are monthly figures shown, a blue line indicates the yearly average. Then, after you have gone but a soto all the trouble to compile and enter your data, you can send it to a printer for a permanent record. Please note that the printer subroutine (lines 1495-1640) is optional and can be deleted. The printer I use is the marvelous DMP-200 sold by Tandy and the CHR\$ codes used are labeled so you can adapt to your own printer.

The high-resolution graph is actually one graph with three available measuring grids. When you compile your information, you will need to decide which range you will want to visualize. This is important because, as you will discover, the larger range you use, the more difficult it is to compare small amounts and small differences of the monthly figures. For example, if you are comparing figures that are less than \$500, to plot these figures on the 0-\$10,000 grid would be of little use. However, put these figures on the 0-\$1,000 grid or the \$400 to \$600 grid and you really have something that you can use.

from crashing when you accidentally hit a wrong key. When using *INPUT* lines, you need to determine what specific responses you want or need. List these with the *IF/THEN* statements and use the *ELSE* line with the reference back to the *INKEY\$* line (see 630 and 1280).

Lines 360 and 470 demonstrate how you can center a heading at the top of your screen and by changing the *PRINT @* figure, you can center your heading anywhere on the screen. I suppose I am too fussy about my displays in that I want everything neat and systematical. Centering those lines can really put polish in your programs.

To Use

Change the items in line 150 to meet your own needs. You need to use ten items (or headings) or leave blank spaces between commas. You could also change line 160 to include the number of headings you want to use. You need to leave "review" as option #10 in the main menu or change line 280. "Review" allows you to return to see previously entered data. **IMPORTANT:** Once you

When you are prompted to select a range for your input data, you will have to select one of the following:

- 0—\$ 1,000 Range -1-
- 0—\$10,000 Range -2-
- \$400—\$600 Range -3-

Once you select a range, if you enter a figure outside of this range, you will be asked to re-enter the figure. Listen for the beep and watch for the new prompt. The purpose for the range figures is for the high-resolution graph. If you do not want to compare dollar figures, change the *A\$* in line 460 and adjust the *PRINT USING* statements in lines 1570 and 1610. You will also need to adjust lines 310, 320, 330 and 1350 to eliminate the dollar signs.

When entering figures, you cannot use commas to separate thousands or you will get an "entry ignored" error statement. Also, to enter a 0, just press *ENTER* and you will be prompted for the next month.

When the entered data is displayed, you have three options, which are listed on the screen:

Y—to see data on high-resolution graph
N—to return to Menu Listing for other comparisons

(NOTE: All previously entered data will be lost once you begin entering new data. If you press "N" accidentally or choose to review previously entered data, select option #10 listed as "REVIEW" and the old data will be displayed. Use the SHIFT , 0 key to type "review" in reverse letters.)

P—sends list to printer (NOTE: You will be prompted with a "PRINTER READY?" Press *ENTER* to begin the line feed.)

When the high-resolution graph is used, you also have three options ("L" & "R" are listed on screen under the word "GRAPH"):

L—to return to the menu listing (see NOTE above)

R—to return and REVIEW data listing display

N—to END program

In case you are not familiar with alpha- numerics, you need to understand that on graphic screens (PMODE1-4), you cannot use regular type, thus you have to use *DRAW* statements and actually draw the letters and numbers on the high-resolution screen. If you are using a small TV monitor (I use a 19 inch Color TV), the alpha- numerics may distort and be unreadable. If this is the case for you, then you'll need to adjust the *DRAW* lines. The letter or number being drawn is indicated on each *DRAW* line.

The Program Summary

10— 120	Program Credits
130— 180	Data Statement, Read Line
185— 290	Menu Loop
295— 350	Range of Graph Selection
355— 440	Data Input Loop for Range #2
445— 630	Data Display
635— 650	Line-Plot Formula
655—1020	General Graph Plot—Grid
1025—1130	Data Line-Plot
1135—1290	Average Line-Plot
1295—1310	Line Plot Formula for Range #1 & 3
1315—1380	Data Input Loop for Range #1 & 3
1385—1490	Graph Plot Change for Range #3
1495—1640	Printer Subroutine
1650—1670	Variable Map

Special Programming Techniques

This program has some interesting programming techniques that I feel are worth mentioning. These hints or suggestions could be useful to any home programmer who has to learn as I do—**THE HARD WAY!**

Line 120 demonstrates a very easy way to freeze a visual on your TV monitor. The range of the *FOR* statement determines how long your program will stall. It is used here to display the program credits.

Lines 290, 350, 630 and 1280 demonstrate how you can keep a program

enter new data in any category, all other data will be lost! The "Review" option can correct a mistaken key being pushed.

If you do not have a printer, you can delete lines 630 and 1495-1640. You also have to delete the second half of line 590. If you delete line 630, change line 620 to: *If R\$="N" then 190 ELSE 600*. If you do not have a printer, I would highly recommend you eliminate these lines to prevent the program from hanging up in the event "P" is typed. If you plan to use a printer, the printer codes are listed in the program lines so you can adapt to your own printer. These codes are for the DMP-200.



ENDICOTT SOFTWARE

ANNIVERSARY SPECIAL!



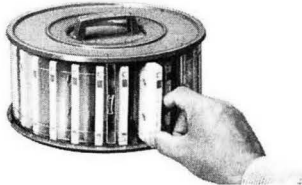
We are 1 year old this month and to celebrate,

TAKE 15% OFF THE LIST PRICE OF EVERY ITEM WE SELL!

(Good Until July 10, 1983)

TAPE CAROUSEL

\$15.00 EACH



TWO OR MORE

\$13.50 EACH

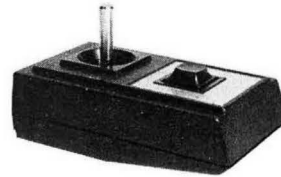
Holds up to 25 cassettes in individual compartments. Units are stackable and revolve for easy access. Clear plastic sliding covers keep tapes dust-free (tapes not included).

JOYSTICKS

DEALER & CLUB INQUIRIES INVITED

ONLY

\$19.95



TWO FOR

\$37.95

"In use, we found the ENDICOTT JOYSTICK to be smooth and responsive. ...built to last, the Endicott model is a solid buy".

- the RAINBOW, October 1982

"...provided the best feel of all the joysticks tested. ...a rugged unit at an affordable price."

- 80micro, March 1983

6 Month Warranty. No adaptor - plugs right in!

EXCELLENT PROGRAMS FROM LEADING SOFTWARE HOUSES

We now carry disk versions! (Requires 32K unless otherwise noted).

ELITE SOFTWARE

	T	D
* ZAKSUND Fantastic!	\$24.95	\$27.95
ELITE-CALC (16, 32, 64K) Spreadsheet	\$44.95	\$44.95

SPECTRAL ASSOCIATES

	T	D
* LANCER A Jousting good time.	\$21.95	.....
* MS. GOBBLER Gobbler's female counterpart.	\$21.95	.....
WHIRLYBIRD RUN Great flying action.	\$21.95	.....
GALAX ATTAX Excellent Galaxian	\$21.95	\$25.95
SPACE RACE Excellent Omega Race	\$21.95	.....
PLANET INVASION Quick action Defender	\$21.95	\$25.95
*SPACE TRADERS Buy stock in universe	\$14.95	\$19.95
companies to become the richest. Like Acquire.		
*COMPVOICE A phoneme speech generation program.	\$34.95	\$39.95

MARK DATA PRODUCTS

	T	D
EL BANDITO Get the food and run.	\$24.95	\$29.95
GLAXXONS Excellent adaptation.	\$24.95	\$29.95
SPACE RAIDERS Not just another Invaders game.	\$24.95	\$29.95
CAVE HUNTER Grab the treasure and outrun the creatures.	\$24.95	\$29.95
HAYWIRE Will drive you BERZERK!	\$24.95	\$29.95

COMPUTERWARE

	T	D
* GRAN PRIX Test your driving skill.	\$21.95	\$26.95
* MOON HOPPER Get to moon-base alive	\$24.95	\$29.95
BLOC HEAD Tricky action.	\$26.95	\$29.95 (16K)
NERBLE FORCE Excellent Defender clone.	\$24.94	\$29.95
MEGAPEDE Most challenging version.	\$21.95	\$26.95
SHARK TREASURE Don't get eaten!	\$21.95	\$26.95
SPACE AMBUSH Action like Galaxian.	\$21.95	\$26.95
DOODLE BUG Like Ladybug	\$24.95	\$29.95
RAIL RUNNER Dodge trains and handcars	\$21.95	\$26.95
PAC ATTACK II Great gobbler. New graphics.	\$24.95	\$26.95
STORM A real Tempest!	\$24.95	\$29.95
COLOR INVADERS Like the original.	\$19.95	\$24.95
SYNTHET - 7 Music synthesizer	\$21.95	\$26.95

TOM MIX

	T	D
THE FROG	\$27.95	\$30.95
* GRABBER	\$27.95	\$30.95
* SPACE SHUTTLE Control the Space Shuttle	\$28.95	.....
* DONKEY KING 4 Screens - Full action!	\$26.95	\$29.95
* COLOR GOLF Challenging! Uses full set of clubs.	\$17.95	.....
TRAP FALL Many "Pitfalls" here!	\$27.95	\$30.95
* ESCAPE FROM S.P.E.C.T.R.E. Graphic Spy Adv.	\$17.95	.....
* KATERPILLAR ATTACK Look out for spiders!	\$21.95	\$24.95
* MOON LANDER 2 games in 1	\$17.95	.....
THE FIXER Loads 600 hex programs to disk	\$17.95	.....
DISK TO TAPE Dump most disks to tape	\$17.95	.....
TAPE TO DISK Load most tapes to disk	\$17.95	.....
* SPELLING TEST Provides a standard oral quiz.	\$19.95	.....

ARIZIN

	T	D
COLORKIT Full of powerful software development tools, aids, bells and whistles.	\$29.95	\$34.95

ANTECO SOFTWARE

	T	ROM PK
KATERPILLAR ATTACK	.....	\$26.95
8-BALL (POOL) All balls shown. Full Cue control.	.....	\$29.95
INTERGALACTIC FORCE Experience trench warfare in your X-Wing fighter.	24.95	\$29.95
*HOUSEHOLD EXPENSE MANAGER Menu-driven with 30 household categories. Screen or printer output.	\$19.95	.....
*STOCK ANALYZER AND TREND Track your stocks. Disk compatible. Optional printer output.	\$21.95	.....

COGNITEC

	T	D
TELEWRITER 64 (For 16, 32, or 64K) THE word processor for the CoCo!	\$49.95	\$59.95

PRICKLY-PEAR SOFTWARE

	T	D
SHAFT New arcade game	\$24.95	\$29.95
* JUNGLE Adventure!	\$19.95	\$24.95
THE DISK MANAGER A must!	.....	\$29.95
THE DISK MASTER Excellent!	.....	\$24.95
* FLIGHT Realistic flight simulator	\$19.95	\$24.95
* 8-BIT BARTENDER Party fun 100 + recipes.	\$19.95	\$24.95
* VIKING Go from peasant to King!	\$19.95	\$24.95
* GANGBUSTERS Lead a life of crime and win!	\$19.95	\$24.95
PANDORA'S GAME BOX Includes: "pac" game, "defender-type" game, Divebomb, Blockade, slot machine, and Squares (like cube).	\$24.95	\$29.95
* PREREAD I, II & III (Three tapes) Prepare your preschooler to learn to read	\$24.95	.....

PETROCCI FREELANCE ASSOCIATES

	T	D
* INSPECTOR CLUESEAU Find the murderer in this excellent graphic adaptation of Clue.	\$19.95	.....
* STAGECOACH Graphic Adventure	\$19.95	.....
* STRESS EVALUATOR Measure and manage your stress	\$24.95	.....

Additional listings in our free catalog - call or write.

* Requires 16K Ext. Basic Minimum. * Requires 32K Ext. Basic Minimum. Others 16K Std. Basic Minimum.

WE PAY SHIPPING!

Other companies ask you to ADD \$1, \$2, \$3, or more for shipping
WE NEVER do to U.S.A., Canada, Mexico.
Add \$2.00 for C.O.D. (U.S.A. Only). Allow 2 weeks for checks to clear.

SHIPPING-ALL OTHER COUNTRIES: Add \$2.00 for each software item. Add \$3.00 for each Joystick, \$10.00 for each carousel. Items will be shipped air mail.

ALL PAYMENTS MUST BE IN U.S. FUNDS.

ENDICOTT SOFTWARE

P.O. Box 12543, Huntsville, AL 35802

(205) 881-0506

PHONE OPEN 7 DAYS A WEEK!



This program has been a lot of fun to develop and will receive a lot of use in my home and business. This program should be bug-proof, however, if you have any problems, just contact me and I will try to help you. This program is available on tape along with another like it to compare various yearly figures. J. D. Ray, 5065 France Avenue, North Charleston, SC 29406. My phone is 1-803-554-0627.

Home Budget Analysis is one of three programs on the Rainbow 'Record.' See page 146.

The listing:

```

10 '***HOME BUDGET ANALYSIS***
20 'BY J. D. RAY
30 ' 5065 FRANCE AVENUE
40 ' N. CHARLESTON, S.C. 29406
50 ' 1-803-554-0637
60 CLS5:PRINT@99,STRING$(26,"%")
;
70 PRINT@131,"% HOME BUDGET ANA
LYSIS %";
80 PRINT@163,"%
  %";
90 PRINT@195,"% BY J. D. RA
Y %";
100 PRINT@227,"% COPYRIGHT (C)
1983 %";

```

295.....034D
490.....05C0
640.....0896
820.....0A77
980.....0CF9
1130 ...0F12
1290 ...113C
1400 ...141C
1560 ...1632
END ...1918

```

110 PRINT@259,STRING$(26,"%");
120 FOR T=1 TO 1200:NEXTT
130 DIM T(13)
140 DIM Q$(10)
145 'INSERT YOUR OWN HEADING FOR
THE MENU LISTING
150 DATA INCOME, ELECTRICAL USE
EXPENSE, TELEPHONE EXPENSE, MEDI
CAL EXPENSE, SAVINGS, CLOTHING E
XPENSE, GROCERY EXPENSE, MISCELL
ANEOUS, AUTOMOBILE EXPENSES,revi
ew
160 FORX=1TO10
170 READ Q$(X)
180 NEXT X
185 'MENU LOOP
190 CLS
200 PRINT@67,"WOULD YOU LIKE TO
COMPARE:"
210 L=130
220 FORX=1TO10
230 PRINT@L,X;Q$(X)
240 L=L+32
250 NEXT X
260 PRINT@460,"(1-10)"
270 INPUT X
280 IF X=10 THEN 460
290 IFX<0 OR X>10 THEN 270
295 'VARIABLE SELECTION
300 CLS:PRINT:PRINT" ALL FIGURE
S ENTERED MUST BE:
310 PRINT:PRINT" 0 - $ 1,000.
00 RANGE <1>"
320 PRINT" 0 - $10,000.00 RA
NGE <2>"
330 PRINT" $-400 - $600.00 RA
NGE <3>"
340 PRINT:INPUT "SELECT RANGE: "
;Z
350 IF Z<1 OR Z>3 THEN 340
355 'DATA INPUT LOOP
360 CLS:PRINT@15-INT(LEN(Q$(X))/
2),Q$(X)
370 T$=Q$(X)
380 PRINT
390 IF Z=1 OR Z=3 THEN GOSUB 132
0
395 'DATA INPUT LOOP FOR RANGE#2
400 FOR X=1 TO 12
410 PRINT "# ";X
420 INPUT "MONTH ";T(X)
430 IF T(X)>10000 THEN PRINT "AM
OUNT IS TOO HIGH. PL
EASE ENTER NUMBER < 10000":SOUND
150,1:GOTO410
440 NEXT X
445 'DATA DISPLAY
450 M=0
460 L=36:P=48:A$="####,###.##"
470 CLS:PRINT @ 15-INT(LEN(T$)/
2),T$

```

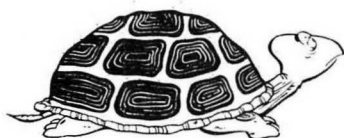
Now a LOGO for the
COLOR COMPUTER

TINY TURTLE

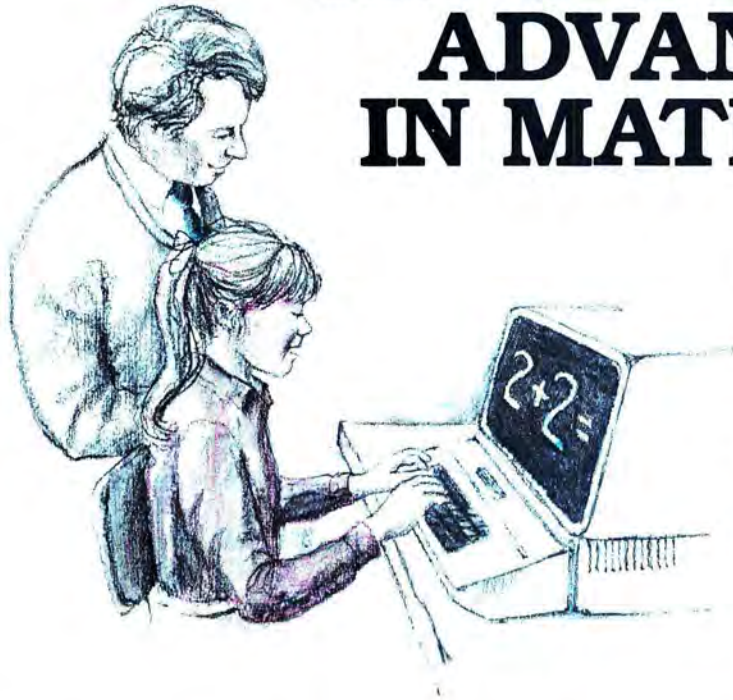
TINY TURTLE is an affordable, fully compatible LOGO language with high resolution turtle graphics, music, fast processor operation, and storing and retrieval of user procedures. TINY TURTLE comes complete with soft-copy reference user manual.

32K/EXTD BASIC/CASSETTE	\$39.95
HARD-COPY MANUAL	\$4.95
SDS COMPUTERS	BOGOTA, N.J.
POB 450	07603

N.J. ADD 5% TAX

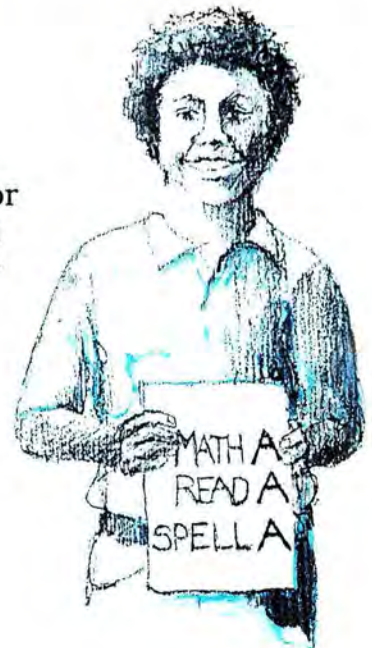


GIVE YOUR CHILD AN UNFAIR ADVANTAGE IN MATH



Help your child gain an advantage by using one of our classroom-tested programs in number concepts, addition, subtraction, multiplication, division, fractions, decimals & percent, pre-algebra, or one of the 15 math games that teach.

For students in grades K through 9, on tape or disk. For TDP and TRS-80 32K Color Computers with extended basic. These professional-quality programs use high resolution graphics with text and sound. They have been written by experienced teachers, tested and revised to provide high-quality and highly motivating instruction. And while you are asking, ask to see our reading and language programs as well.



**ASK FOR MICRO SCHOOL
PROGRAMS BY NAME at your
local computer store.**

BERTAMAX INC.
Max Jerman, Ph.D.,
President



PERSONALIZED INSTRUCTION ON PERSONAL COMPUTERS

```

480 FORX=1 TO 12
490 PRINT@L,"MONTH # ";X:PRINT@P
, USING A$;T(X)
500 L=L+32:P=P+32
510 NEXT X
520 T=T(1)+T(2)+T(3)+T(4)+T(5)+T
(6)+T(7)+T(8)+T(9)+T(10)+T(11)+T
(12)
530 PRINT@416,"TOTAL: ";:PRINT
USINGA$;T
540 T=T/12
550 IF Z=1 THEN M=INT(T/20)*3
560 IF Z=2 THEN M=INT(T/200)*3
570 IF Z=3 THEN M=INT(T/20)*3
580 PRINT@448,"AVERAGE: ";:PRINT
USINGA$;T
590 PRINT@437,"GRAPH? Y/N":PRINT
@469,"PRINT? <P>"
595 'SELECTION- (Y) TO SEE HIGH
RESOLUTION GRAPH; (N) TO RETURN
TO MENU; & (P) TO SEND DATA TO P
RINTER
600 R$=INKEY$:IF R$="" THEN 600
610 IF R$="Y" THEN 640
620 IF R$="N" THEN 190
630 IF R$="P" THEN 1500 ELSE 600
635 'LINE PLOT FORMULA FOR RANGE
#2
640 A=INT(T(1)/200)*3:B=INT(T(2)
/200)*3:C=INT(T(3)/200)*3:D=INT(

```

```

T(4)/200)*3:E=INT(T(5)/200)*3:F=
INT(T(6)/200)*3:G=INT(T(7)/200)*
3:H=INT(T(8)/200)*3:I=INT(T(9)/2
00)*3:J=INT(T(10)/200)*3:K=INT(T
(11)/200)*3:L=INT(T(12)/200)*3:
650 IF Z=1 OR Z=3 THEN GOSUB 130
0
655 'GENERAL GRAPH PLOT - GRID
660 CLS:PMODE3,1:COLOR1,2:PCLS:S
CREEN1,0
670 FORY=25TO175STEP15
680 LINE(35,Y)-(244,Y),PSET
690 NEXT Y
700 COLOR 1,2
710 FORX=35TO244 STEP19
720 LINE(X,25)-(X,175),PSET
730 NEXT X
740 DRAW"S2;BM35,185U10G3" '1
750 DRAW"BM56,185L6U5R6U6L6" '2
760 DRAW"BM71,185R8U10L8R8D5L7R7
D5" '3
770 DRAW"BM90,184BU5U5D5R8U5D10"
'4
780 DRAW"BM109,185R9U6L9U5R9" '5
790 DRAW"BM128,185U10R10L10D5R10
D6L10" '6
800 DRAW"BM148,185U5E6L8D1" '7
810 DRAW"BM166,185U10R8D5L8R8D6L
8" '8

```

SUPERIOR ORACLE SOFTWARE
PRESENTS

THE C C QUBE

A MAGIC CUBE SIMULATION FOR THE COLOR COMPUTER

FEATURING:

- Easy to use commands
- Fast - uses machine language routines
- Random mixes
- Undo moves or random mixes
- See all 6 faces
- Save QUBE to tape for later reload
- Only \$14.95



Send Check or M.O. to:

SUPERIOR ORACLE SOFTWARE
PO Box 4505
Greenwich, Conn. 06830

Conn. residents add 7 1/2% sales tax
Shipping and handling included

Personal checks require
2 weeks to clear

No C.O.D.s

Requires 16K Extended Basic

MORETON BAY SOFTWARE

For TRS 80 Color Computer & TDP 100

PROGRAMERS TOOLKIT

6 USEFUL TOOLS FOR THE SERIOUS COMPUTER USER

CHAINRUN - Add a single line to a Basic program and subsequent Basic programs load and run automatically. Allows program chaining.

HEXEDIT - ML program which gives full screen edit capability in Hexadecimal or ASCII for any RAM address in memory. Can be used to patch ML routines in memory.

DUMP - Displays the memory contents of ML programs.

CMERGE - ML subroutine which saves the trouble of retyping long subroutines. Merge different Basic programs into one large program.

CROSS REFERENCE - ML program which prints line location of all variables and sorted cross reference list for the source and destination for every GOSUB and GOTO statement in a Basic program.

BASIC FULL SCREEN EDIT - ML program which will give full screen edit capability for any Basic program. Edit programs with cursor control.

16K

\$28.95 postage paid

includes 10 pages of Documentation.



TRS 80® Tandy Corp.

MORETON BAY SOFTWARE
A DIVISION OF MORETON BAY LABORATORY

316 Castillo Street
Santa Barbara, CA 93101
(805) 962-3127

California residents add 6% sales tax.


```

820 DRAW"BM189,185U10L8D5R8" '9
830 DRAW"BM203,185U10G3":DRAW"BM
207,185U10R8D10L8" '10
840 DRAW"BM223,185U10G3":DRAW"BM
227,185U10G3" '11
850 DRAW"BM241,185U10G3":DRAW"BM
249,185L8U5R8U6L8" '12
860 IF Z=3 THEN GOTO 1390
870 DRAW"S3;BM20,175U10R10D10L10
" '0
880 DRAW"BM25,160U10G3" '1
890 DRAW"BM26,145L8U4R8U6L8" '2
900 DRAW"BM27,130U10L8R8D4L6R6D6
L8" '3
910 DRAW"BM25,115U11G6R9" '4
920 DRAW"BM20,100R8U6L8U4R8" '5
930 DRAW"BM20,85U10R8L8D5R8D6L8"
'6
940 DRAW"BM23,70U6E5L7" '7
950 DRAW"BM20,55U10R8D5L8R8D6L8"
'8
960 DRAW"BM27,40U10L8D5R8" '9
970 DRAW"S2;BM1,28U2E8U2BL8D2F8D
2":DRAW"S2;BM9,28U10G3":DRAW"BM1
2,28U10R8D10L8":DRAW"BM21,28U10R
8D10L8":IF Z=2THENDRAW"BM28,28U1
0R8D10L8" 'X1000
980 DRAW"S5;BM80,15U10R10D2U2L10
D10R10U4L4" 'G
990 DRAW"BM100,15U10R10D5L10R5F5
" 'R
1000 DRAW"BM120,15U5E5F5L10R10D5
" 'A
1010 DRAW"BM140,15U10R10D5L10D5"
'P
1020 DRAW"BM160,15U10D5R10U5D10"
'H
1025 'DATA-LINE PLOT
1030 COLOR4,2
1040 V=175
1050 IF Z=3 THEN V=115
1060 LINE (35,V-A)-(54,V-B),PSET:
LINE -(73,V-C),PSET:LINE-(92,V-D
),PSET:LINE-(111,V-E),PSET:LINE-
(130,V-F),PSET:LINE-(149,V-G),PS
ET:LINE-(168,V-H),PSET:LINE-(187
,V-I),PSET:LINE-(206,V-J),PSET:L
INE-(225,V-K),PSET:LINE-(244,V-L
),PSET
1070 LINE (5,10)-(10,10),PSET
1080 DRAW"S2;BM15,13U10R6F4D5G3L
6" 'D
1090 DRAW"BM25,13U5E5F5L10R10D5"
:DRAW "BM41,13U5E5F5L10R10D5" 'A
1100 DRAW"BM35,13U8L5R8" 'T
1110 COLOR 3,2
1120 V=175
1130 IF Z=3 THEN V=115
1135 'AVERAGE-LINE PLOT
1140 LINE (35,V-M)-(244,V-M),PSE

```

```

T
1150 LINE (205,10)-(210,10),PSET
1160 DRAW"S2;BM216,13U6E5F5L9R9D
6" 'A
1170 DRAW"BM227,13H5U5D5F5E5U5BD
10" 'V
1180 DRAW"BM233,13U8R8D1U1L8D8R8
U4L3R3D4" 'G
1190 LINE (241,13)-(242,13),PSET:
LINE (241,12)-(242,12),PSET
1200 DRAW"C1;BM110,23H5E5" '<
1210 DRAW"BM119,23U10D10R6" 'L
1220 DRAW"BM133,23U10R9D5L9R3F6"
'R
1230 DRAW"BM145,23E5H5" '>
1240 DRAW"BM126,20L2" '-
1245 'SELECTION-(L) TO RETURN TO
MENU LIST; (R) TO REVIEW DATA E
NTERED; & (N) TO END PROGRAM.
1250 R$=INKEY$:IFR$=""THEN1250
1260 IF R$="L" THEN 190
1270 IF R$="R" THEN 460
1280 IF R$="N" THEN END ELSE 125
0
1290 END
1295 'LINE PLOT FORMULA FOR RANG
E# 1 & 3
1300 A=INT (T (1) /20) *3:B=INT (T (2)
/20) *3:C=INT (T (3) /20) *3:D=INT (T (

```



AUTOTERM
 TURNS YOUR COLOR COMPUTER INTO THE
WORLD'S
SMARTEST TERMINAL!
 YOU'LL ALSO USE AUTOTERM FOR SIMPLE
 WORD PROCESSING & RECORD KEEPING.

EASY TO USE

ON-THE-SCREEN EDITING via cursor. Full prompting. Scrolling. Key Beep & Error Beebop.

PLEASANTLY POWERFUL

Total communications ability at 110 to 1200 baud. Transmit text, graphics, BASIC and Machine Language. Save & Load cassette/disk files while on line. Scan/Edit current data while receiving more data. Use any modem. Fully supports D. C. Hayes & others. Use any printer, page size, margins, line spacing. Override narrow text width of received data. Imbed printer controls.

TRULY AUTOMATIC

Automate almost any communications activity. Dial via modem, sign-on, interact, sign-off. Perform an entire session. Act as a message taker. Keystroke Multipliers may include parameter changes, editing, time delays, execution of other multipliers, looping, waiting for partially specified responses, and branching based upon alternative responses. Self-test mode.

32K MEMORY RECOMMENDED

CASSETTE \$39.95 **DISKETTE (coming soon) \$49.95**
 Add \$3 Shipping & Handling
 MC/VISA/COD

PXE Computing
 11 Vicksburg Lane
 Richardson, TX 75080

Eves. & Weekends: 214/699-7273
Weekdays: MICRO CONCEPTS
 214/458-0330



```

4)/20)*3:E=INT(T(5)/20)*3:F=INT(
T(6)/20)*3:G=INT(T(7)/20)*3:H=IN
T(T(8)/20)*3:I=INT(T(9)/20)*3:J=
INT(T(10)/20)*3:K=INT(T(11)/20)*
3:L=INT(T(12)/20)*3
1310 RETURN
1315 ' DATA INPUT LOOP FOR RANGE
1 & 3
1320 FOR X=1 TO 12
1330 PRINT "# ";X
1340 INPUT "MONTH ";T(X)
1345 IF Z=1 THEN GOTO 1360
1350 IF Z=3 AND T(X) <-450 OR T(
X) > 600 THEN PRINT"AMOUNT IS OU
T OF RANGE.":PRINT"PLEASE ENTER
NUMBER BETWEEN":PRINT" $-400.
00 - $600.00":SOUND 150,1:GOTO 1
330
1360 IF Z=1 AND T(X)>1000 THEN P
RINT"AMOUNT IS TOO HIGH.":PRINT"
PLEASE ENTER NUMBER < 1000":SOUN
D 150,1:GOTO 1330
1370 NEXT X
1380 GOTO 460
1385 'GRAPH PLOT CHANGE FOR RANG
E #3
1390 DRAW"S3;BM15,170L3":DRAW"BM
25,175U11G6R9" '-4
1400 DRAW"BM15,155L3":DRAW"BM27,

```

```

160U10L8R8D4L6R6D6L8" '-3
1410 DRAW"BM15,140L3":DRAW"BM26,
145L8U4R8U6L8" '-2
1420 DRAW"BM15,125L3":DRAW"BM25,
130U10G3" '-1
1430 DRAW"BM20,115U10R10D10L10"
'0
1440 DRAW"BM25,100U10G3" '1
1450 DRAW"BM26,85L8U4R8U6L8" '2
1460 DRAW"BM27,70U10L8R8D4L6R6D6
L8" '3
1470 DRAW"BM25,55U11G6R9" '4
1480 DRAW"BM20,40R8U6L8U4R8" '5
1490 GOTO 970
1495 'PRINTER SUB-ROUTINE
1500 PRINT @ 437,"PRINTER":PRINT
@ 469,"READY?":SOUND 160,2
1510 R$=INKEY$:IF R$="" THEN 151
0:IF R$="" THEN GOTO 1520
1520 PRINT#-2,CHR$(27);CHR$(19)
'SELECT STANDARD CHARACTER
1530 PRINT#-2,CHR$(15) 'START UN
DERLINE
1540 PRINT#-2,T$
1550 PRINT#-2,CHR$(14) 'END UNDE
RLINE
1560 FOR X=1 TO 12
1570 PRINT #-2,USING"##. ";X;:PRI
NT#-2,USING"$###,###.##";T(X)
1580 NEXT X
1590 PRINT#-2,CHR$(10) ' LINE FE
ED
1600 T=T(1)+T(2)+T(3)+T(4)+T(5)+
T(6)+T(7)+T(8)+T(9)+T(10)+T(11)+
T(12)
1610 PRINT#-2,"TOTAL: ";:PRINT
#-2,USING"$###,###.##";T
1620 T=T/12
1630 PRINT#-2, "AVERAGE: ";:PRIN
T #-2,USING"$###,###.##";T
1640 GOTO 590
1650 'VARIABLE MAP:
1651 'T(X) - INPUT DATA FOR MONT
HS OF YEAR OR 12 PERIODS OF TIME
1652 'Q$(X) - MENU SELECTION
1653 ' Z - RANGE OF INPUT DATA
1654 ' T$- HEADINGS FROM MENU
1655 ' T - TOTAL OF T(X)'S AND A
VERAGE
1656 ' M - VARIABLE FOR AVERAGE
LINE PLOT
1657 ' A-L - VARIABLES FOR THE 1
2 MONTHS OR TWELVE PERIODS
1658 ' R$ - SELECTION STRING:
1659 ' Y - YES
1660 ' N - NO (END)
1661 ' P - PRINTER
1662 ' L - RETURN TO MENU LIST
1663 ' R - REVIEW
1670 'MEMORY AVAILABLE - 2107

```

STOCK & FUND INVESTING

with the
TRS-80 COLOR COMPUTER
 USE FUNDGRAF & FUNDFILE

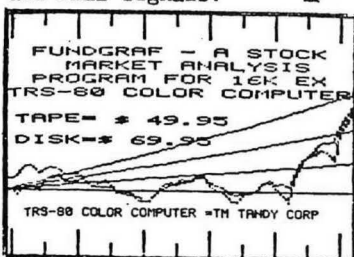
FUNDGRAF is a stock market analysis program that not only graphs and analyzes funds or stocks, but also makes decisions on when to BUY and SELL.

- GRAPHS fund's progress (up to 200 weeks).
- SUPERIMPOSES for comparison:
 - a line of constant percent growth.
 - a graph of any other fund (or stock).
- CALCULATES over any given time span:
 - the percent price change.
 - the moving average (any span).
- INDICATES BUY and SELL signals.

- **FUNDGRAF** -
 TAPE @ \$49.95
 DISK @ \$69.95

- **FUNDFILE** -
 DISK only @ \$27.95

- ADD \$2 Handling on all orders.
- Details? SEND SASE
- 16 K ECB Required. -printer optional



FUNDFILE is a portfolio and account management program for securities. It creates files for up to 900 transactions & 50 securities and reports asset value, realized & unrealized capital gains, adjusted costs (for stock dividends), and MORE!!

PARSONS SOFTWARE, DEPT. A
 118 WOODSHIRE DRIVE
 PARKERSBURG, WV 26101

PETROCCI FREELANCE ASSOCIATES



**PROGRAM DEVELOPMENT: Computer Software
Documentation / Graphics / Consultation**



Inspector CLUEseau

Sherlock Holmes/Agatha Christie fans-It's finally here—A murder mystery game for the 80-C! Mr. Goodbody has been killed in his mansion and you must solve the mystery. WHO committed the murder, WHERE did it occur and HOW was it done! Question suspects, find the secret passage, and break the code to get clues. Hi-Res graphics enhances this excellent game. The computer records the clues you obtain on a clue inventory screen and also provides suspect descriptions at the touch of a finger. A fast, fun game that will sharpen your deductive skills. Every game is different!

32K Extended \$19.95

Stress Evaluator

Assess your present level of stress and how it affects your potential for illness. Evaluate the amount of life change you can effectively handle in the future. The Stress Evaluator is a valuable tool for recognizing, measuring and managing stress. The program also provides a Coping Ability Test which shows your ability to handle stress in general. Provides goal setting exercises and meditation graphic screens to help achieve stress-alleviating goals. All results output to printer.

16K Extended \$24.95

Weather Watch

If you **really** care about the weather, this program is for you. Three programs provide you with National Weather Service approved statistics in a monthly report format. Input of daily high and low temp. and rainfall outputs a report of monthly average temps. and range; high and low averages; high and low temp. for month; total rainfall; days rain > .1 in.; heating and cooling degree days; days high > 90; days low < 32; days low temp. < 32 and > 0; days low < 0; day of highest range. Also retrieves a single day from data file for review. All data outputs to printer. Well documented.

16K Extended \$24.95

Forecaster & Weather Watch (Disk)

Forecast general weather conditions with 80% accuracy with this fun, simple to use program. Although not meant to replace National Weather Service forecasts, this program is informative and enjoyable to use. You can even create your own weather by setting the variables!! Provides general forecast including precipitation probabilities. Includes Weather Watch program also all on one easy to use disk.

32K Extended Disk \$49.95

Include \$1.50 for handling for each program.

Az. Residents add 6% Sales Tax.

Quantity Discounts to Dealers.

CIS subscribers contact through EMAIL 70435,754



PETROCCI FREELANCE ASSOCIATES

651 N. Houghton Rd.
Tucson, AZ. 85748
602-296-1041

Stagecoach

Enter the Wild West Days as you try to carry gold across the desert in a stagecoach. Hot in pursuit are the James Gang and of course, Indians!! To make matters worse you are responsible for the safe journey of Annabelle, the judge's daughter. Hi-Res graphic screen plots your progress. Lots of fun surprises await you in this game -shootouts, kidnappings and more. Don't miss the fun!

16 K Extended \$19.95

Heart-Lung-Circulatory Systems

Hi-Res Graphic Education

A difficult subject becomes fun and easy to learn. Programmed learning approach divides subject content into concise frames of information. Hi-res graphic display with labelled anatomical structures follows text frames for added clarity. Visually highlights keywords and concepts. Self test questions follow each section. Provides immediate feedback to user response and displays correct answers before moving to new subject matter. Excellent for school or home use.

32KEXT Cassette \$34.95

32KEXT Disk \$39.95

Bowling Secretary

Save hours of tedious work with this efficient program. Calculates individual player average, high game and total pins, as well as team games won/lost, high series, and cumulative total team pins. Also calculates team standings for each week in order from 1st to last! All data stores to tape and outputs to printer to provide professional, easy to read copy. After initial input of league and player names all you have to do is input each week's scores - the computer does the rest!!

16KEXT Cassette \$24.95

32KEXT Disk \$29.95

Astrology Chart Print

A Must for the Serious Astrologer

Bothered by not having a professional easy to read hard copy of your chart? Want to see comparison charts around the Natal Chart? Look no more! Input of planetary positions and house cusps outputs a 6"x5" graphic printout of chart and will also plot a comparison chart (transit, progressed or compatibility) around perimeter of the natal chart. NOT A SCREEN DUMP ROUTINE. The program uses dot addressable graphics to draw chart with accurate planetary positioning. Top of form lists Name, Birthdate, Birthtime, Birthplace from user input. Accommodates Placidian, Equal House or Modified Equal House. AVAILABLE NOW FOR EPSON MX80 with Graftrax.

32KEXT Cassette \$21.95

Medical Terminology

If you've ever wondered what your doctor was talking about, this program can help! Includes most common terminology as well as abbreviations used in hospital charting. Menu Driven -allows choice of study, definition readout or self test. Study suffix, prefix or abbreviation in alphabetical groups. Input prefix, suffix or abbreviation and computer reads out definition (not meant to be an all inclusive dictionary). Provides multiple choice self tests with immediate reinforcement and correct answer displayed. Suffix/Prefix on one program. Abbreviations on 2nd Program. Both included.

16KEXT Cassette \$19.95

New EPROM Programmer Is Impressive And Affordable

How would you like to have your favorite monitor or other machine language programs on instant recall, protected against resets and other inevitable bombouts? I guess at one time or another any computer hobbyist has wished for an EPROM programmer but the outlay of several hundred dollars didn't seem worthwhile. A commercial EPROM burner can cost from \$500-\$1000, with personality modules and a Radio Shack 232 interface as extras. Intronics has come to our rescue. Now for less than \$90 you can buy an *EPROM Programmer* that, in my opinion, is better than the expensive models. How about you brave souls who have been thinking about changing some of the routines in the Extended BASIC ROMS?

Intronics *EPROM Programmer* is a TRS-80 compatible board that plugs into the expansion port. The 4" x 4 1/4" circuit is not in a housing since you need access to the low-insertion force socket on the board. Also, the board contains a power-on indicator and an off/on switch along with the necessary ICs. A 24 volt DC to DC converter is self-contained as this voltage is necessary for programming. I am very pleased with the appearance of the circuit board and construction. By the way, the EPROM socket has 28 pins for future state of the art changes. Different EPROMs are selected by means of a personality module. Five modules come with the unit and cover the normal range of EPROMs

from 1 to 8K. Other personality modules are available for \$5 each, such as a 68764, the EPROM replacement for the BASIC ROM.

Software for the programmer is supplied on cassette tape and uses addresses \$2000-\$3FFF for program memory. Commands are as follows:

ERASED — Checks for \$FF in all EPROM memory locations, the normal erased state.

PROGRAM — Memory from the buffer is programmed into the EPROM.

VERIFY — Compare the data in the EPROM and in the memory buffer.

SLIDE ROM — Moves the data from the EPROM to the memory buffer.

SLIDE MEMORY — Moves memory from one location to another.

EXAMINE/CHANGE MEMORY — Modify buffer, or other memory.

RETURN TO BASIC — Return to BASIC.

The menu is well prompted and user friendly. All of the functions worked flawlessly. The memory examine/change command could use a few bells and whistles, but works as intended. The beauty of this system is in the fact that any program that will load into the CoCo can be moved into the buffer, modified if necessary, and burnt into an EPROM.

As you can tell I was impressed by the *EPROM Programmer*, especially after using units that cost ten times as much and having to manipulate disk files, edit programs, etc., just to enter data into the programmer. I tried assembling a program in memory, moving it to the buffer, and burning an EPROM. Each step worked without a hitch. The documentation leaves a little bit to be desired but due to prompts in the software it is adequate. I would suggest that instructions be included for the uninitiated to explain how to modify a ROM pack to accept different EPROMs, and for that matter, a short explanation of the different types. I would recommend this unit for both hobby and commercial use. You may be better off buying a CoCo and this unit than a Pro-Log—it certainly would be cheaper.

(Intronics, P.O. Box 13723, Edwardsville, KS 66113, \$85)

—Dan Downard



PRICKLY-PEAR SOFTWARE
QUALITY PROGRAMS FOR YOUR COCO & TDP-100
PROGRAMS REQUIRE 16K EXTENDED BASIC FOR TAPE, AND 32K DISK UNLESS OTHERWISE NOTED.

Due to the growth provided by our many loyal customers, we at Prickly Pear Software have moved to larger quarters. Please make note of our new address.

Thank You.

our new address is:

PRICKLY PEAR SOFTWARE
9234 E. 30th Street
Tucson, Arizona 85710

Submitting Material To the Rainbow

Contributions to *the RAINBOW* are welcome from everyone. We like to run a variety of programs which will be useful/helpful/-fun for other CoCo owners.

Program submissions must be on tape or disk and it is best to make several saves, at least one of them in ASCII format. We're sorry, but we do not have time to key in programs. All programs should be supported by some editorial commentary, explaining how the program works. We're much more interested in how your submission works and runs than how you developed it. Programs should be learning experiences.

We do pay for submissions, based on a number of criteria. Those wishing remuneration should *so state* when making submissions.

For the benefit of those who wish more detailed information on making submissions, please send a SASE to: Submissions Editor, *the RAINBOW*, P.O. Box 209, Prospect, KY 40059. We will send you some more comprehensive guidelines.

Please do not submit programs or articles currently submitted to another publication.

Disk Operator Reveals Powerful New Routines

By Roger Schrag

Radio Shack thoughtfully included a technical information section in their Color Computer disk system manual. This section was designed for machine language programmers who wanted to incorporate disk I/O into their programs.

Unfortunately, the information provided is in most cases perfectly useless. The one routine within the disk ROM that they show you how to use will merely read or write an individual sector on the diskette. The programmer must write his own routines to locate a file on the diskette, allocate disk space, create new files, delete old files, shut off the disk drive motor when it is not in use...and the list of responsibilities left for the poor programmer to take care of goes on and on.

modes are supported; the direct access mode is *not* supported. Neither is cassette I/O. I hope to cover both of these topics in a future article.

\$000	Basic program
\$0FF	Basic program in ASCII format
\$100	Data stored in binary
\$1FF	Data stored in ASCII
\$200	Machine language program
\$300	Text stored in binary
\$3FF	Text stored in ASCII

Table 2: File Types

Code	Abbr	Description
19	AO	File already open
20	DN	Bad device or drive number
21	IO	Input/output error
22	FM	Bad file mode
23	NO	File not open
24	IE	Input past end of file
27	NE	File not found
29	DF	Disk space full
30	OB	Out of buffer space
31	WP	Diskette write protected
32	FN	Bad filename
33	FS	Bad file structure
37	VF	Verification error

Table 1: Error Codes

What I would like to present here is a program that will perform a potpourri of disk-oriented operations. I have carefully scrutinized the disk ROM, and come up with some powerful routines that Radio Shack never told you about. The program contains seven routines that are analogous to the BASIC statements Files, Open, Close, Print#, Input#, Kill and Verify. Each routine does a complete job. Your program will need to do a minimal amount of work, such as supplying a filename or device number.

Please have a thorough understanding of the BASIC statements mentioned above before proceeding onward. Also please note that only the sequential input and output

NEW from **CoCoHut** 

THE ULTIMATE STRATEGY GAME

ZARCONIAN MARBLE

1 or 2
players

16K Ext.
Basic
required

Cassette \$19.95

Disk \$24.95

Send check or money order to:

COCOHUT
P. O. Box 24451
Houston, TX 77015



The source code shown in Listing 1 may be appended onto your program to give it disk I/O capabilities. Now let's look at each of the seven routines and see how they are used.

The Files routine organizes the disk system's area of memory by dividing it into smaller segments called buffers. Each buffer is 281 bytes, and is used by the disk system to work with a file while it is open.

For this many buffers	Don't use any memory below
0	\$OBA2
1	\$OCBB
2	\$ODD4
3	\$OEED
4	\$1OO6
5	IIIF
6	\$I238
7	I35I
8	I46A
9	I583
10	\$I69C
11	I7B5
12	\$I8CE

Table 3: Reserved Memory

You should use the Files routine at the beginning of your program in order to initialize and organize the disk system's memory. Decide on the maximum number of files you will want to have open at any given time; this is the number of

buffers you will need. Put this figure into the B register and call the Files routine. Be sure that the buffer area won't overlap your program. Table 3 lists the boundary lines. This example would allocate space for six files, thus allowing your program to use device numbers of 1, 2, 3, 4, 5 or 6:

```
LDB #6 WE WANT SIX BUFFERS
JSR FILES GO SET UP MEMORY
```

The Open routine works in much the same way that the BASIC statement works. You will need to prepare the X, Y, A, and B registers with certain data before calling the routine. The X register must be loaded with the starting address of where in memory the filename is stored. Any filename that is valid in BASIC is valid here. Don't put quotes around the name, and if you don't specify an extension, then none will be used. Place a zero or \$OD (ASCII code for a carriage return) after the last character in the filename, so that the routine will be able to tell how many characters long the name is.

Next, the Y register must be loaded with the file type. A list of file types is shown in Table 2. A file's type will appear in a directory generated by the DIR statement from BASIC.

The A register must be loaded with the mode you would like to use. Use \$49 (ASCII code for I) for the input mode, and \$4F (ASCII code for O) for the output mode. Finally, you will need to load the B register with the device number you wish to assign to this file. Be sure that you have set aside enough buffer space with the Files routine.

When you have all four registers set up properly, you are

™ TRS80 color

From the January 1981 issue of the CSRA Computer Club newsletter:

There was some amusement at the November meeting when the Radio Shack representatives stated that the software in the ROM cartridges could not be copied. This month's 68 Micro Journal reported they had disassembled the programs on ROM by covering some of the connector pins with tape. They promise details next month. Never tell a hobbyist something can't be done! This magazine seems to be the only source so far of technical information on the TRS-80 color computer™. Devoted to SS-50 6800 and 6809 machines up to now, 68 Micro Journal plans to include the TRS-80 6809 unit in future issues.

NOTE: This and other interesting and needed articles for the Radio Shack TRS-80 color computer™ are being included monthly in 68 Micro Journal—The Largest specialty computer magazine in the world!

68 MICRO JOURNAL

5900 Cassandra Smith Road
Hixson, Tennessee 37343
615 842-4600

Subscription Rates

USA: 1-year \$24.50; 2-year \$42.50; 3-year \$64.50
CANADA and MEXICO: Add \$5.50 per year to USA Price
Foreign Surface: Add \$12.00 per year to USA Price
Foreign AIRMAIL: Add \$36.00 per year to USA Price

** Sample issue - \$3.50



68 Micro Journal™ was established with one objective in mind; to provide a Magazine FOR 68xx Users BY 68xx Users. Because of a strict advertiser policy, 68 Micro Journal™ has gained a strong following WORLDWIDE because the reader KNOWS what he is getting when purchasing from a 68 Micro Journal™ Advertiser. It has gained a strong User following because most of the material published is contributed BY USERS, and, therefore, is relevant to the Users needs.

Currently, and even before the Color Computer™ hit the stores, 68 Micro Journal™ was devoting more space to the TRS-80C Color Computer™ and information concerning the Motorola 6809 (which is the CPU in the Color Computer™) than ANY OTHER Computer Magazine. Examples include:

REVIEWS of the three major Disk Control Systems for the Color Computer™, most of the Monitors, Assemblers, and Disassemblers, Word Processors and Editors, "Terminal" Programs (for use with Modems, Communications with other Computers, etc.), and of course, Games.

HINTS for Expanding Memory, Power Supply Cooling, repairing sticky keyboards, disabling the ROM PAK "Take Over", hooking up to Printers, etc.

DISCUSSIONS of the 6883 Synchronous Address Multiplexer, using the Color Computer™ with 64K and 96K memory (which it is ALREADY capable of handling), thoughts on Programming, etc.

I suggest that you subscribe to 68 Micro Journal™, SOON, as many back issues are sold-out.

We still, and will continue to, lead in the type information you need to FULLY UTILIZE the POWER of the 6809 in the Radio Shack TRS-80 Color Computer™.

Bob Nay
Bob Nay
Color Computer Editor

ready to call the Open routine to open the file. This example will open an ASCII data file for output. The filename will be CHECKS/DAT:I, and device number two will be used. Note that the quote marks are used here as delimiters for the FCC instruction:

```

LDX #NAME ADDRESS OF FILENAME
LDY #SIF FILE TYPE: ASCII DATA
LDA #$4F OUTPUT MODE
LDB #$2 USE DEVICE NUMBER
TWO
JSR OPEN GO OPEN THE FILE
JMP MORE PROGRAM CONTINUES...
NAME FCC "CHECKS/DAT:I"
FCB $0 TERMINATOR

```

The Close routine will close a particular file and update the diskette if necessary. To close a file, load the device number into the B register and call the Close routine. Note that no error will occur if you try to close an already closed file. This example will close device number three:

```

LDB #$3 DEVICE NUMBER THREE
JSR CLOSE GO CLOSE THE FILE

```

The Print routine will write a byte of data to a file which is open in the output mode. To use the routine, put the device number of the file you wish to write to in the B register, and the ASCII code of the character you wish to write in the A register. Then call the Print routine. Note that this routine will only write to one character at a time; you will need a simple loop to write groups of characters, or entire messages. This example will write the message "Accounts payable" to device number one:

```

LOOP LDX #MESSAGE START OF MESSAGE
LDA ,X+ GET CHARACTER
TSTA CHECK FOR END
BEQ MORE GO ON IF ALL DONE
LDB #$1 TO DEVICE NUMBER
ONE
JSR PRINT GO WRITE CHARACTER
BRA LOOP LOOP BACK FOR AN-
OTHER
MESSAGE FCC "ACCOUNTS PAYABLE"
FCB $0 TERMINATOR

```

The Input routine will read a byte of data from a file open in the input mode. To use the routine, place the device number of the file you wish to read from into the B register and call the Input routine. The A register will now contain the ASCII code of the character read from the file. Note that, once again, you will need a simple loop to deal with entire groups of characters. This example will read a character from device number four and display it in the upper left corner of the screen:

```

LDB #$4 FROM DEVICE NUMBER
FOUR
JSR INPUT READ A CHARACTER
STA $400 DISPLAY ON SCREEN

```

The Kill routine will delete a file from the directory and

```

*****
*
* LETTER
* SETTER
* TYPESET
* THIS AD
*

```

```

* With LETTER-SETTER'S big bold
* headlines and your own unique
* text, you can print a message
* that no one will ignore!
*

```

```

* ACT
* UAL
* SIZE
*

```

- ```

* Qualities:
* - LARGE, CLEAR LETTERS
* - EASY TO USE
* - THREE PRINT SIZES
*

```

- ```

* Requirements:
* - 16K EXTENDED COLOR BASIC
* - DOT ADDRESSABLE PRINTER
* - YOUR IMAGINATION
*

```

- ```

* Uses:
* - REPORT HEADINGS
* - FLYERS
* - CHURCH BULLETINS
*

```

```

* PLEASE SEND ME LETTER-SETTER!
*

```

```

* Name:
*

```

```

* Address:
*

```

```

* City, State:
*

```

```

* PRINTER TYPE:
*

```

```

* _____ * @ $39.95/ea ROM PACK
*

```

```

* _____ * @ $24.95/ea on TAPE
*

```

```

* BERNIE LITTON
* P.O. BOX TWO
* CHICAGO, ILLINOIS 60690
* (312) 944-2444
*

```

```

```

free up any diskette space that was allocated to it. To kill a file, load the X register with the address of the filename and call the Kill routine. This example will delete a file named STOCKS/FEB:

```

LDX #NAME ADDRESS OF FILENAME
JSR KILL DELETE THE FILE
JMP MORE PROGRAM CONTINUES
NAME FCC "STOCKS/FEB"
FCB $0 TERMINATOR

```

The Verify routine will either activate or deactivate the verification system. With this system turned on, the disk system will automatically verify all write operations. To use the routine, load the status code into the B register and call the Verify routine. One means on, zero means off. This example will turn the verification system on:

```

LDB #1 ONE MEANS TURN IT ON
JSR VERIFY ACTIVATE VERIFY SYSTEM

```

Each of the seven routines will handle reasonable error conditions—such as a write protected diskette, an improperly mounted diskette, or a file not found in the directory. However, the routines are not thoroughly bomb-proof. If, for example, you try to write data to device number 47, strange things will surely happen.

After calling a routine, the B register will contain zero and the Z flag in the condition code register will be set if the operation was performed successfully. If an error has occurred, then the Z flag will be reset, and the value in the B register will be the error code. Table 1 contains a listing of various error codes. This program uses the error vector at \$18E to handle error conditions. However, no problems should arise if your program also uses this vector, unless you are working with interrupt driven software.

The routines will preserve all registers except for B and CC. The one exception to this rule is the Input routine which will replace the previous contents of the A register with the ASCII code of the character read in from the file. Note that your program may redefine the Direct Page register. The register will be temporarily reset to zero so that the ROM routines will function properly, and then it will be reset to its previous value.

If you don't specify a drive number in the filename, drive zero will be used as the default. To change the default, store

the desired drive number at memory location \$95A. This example will make drive one the default drive:

```

LDB #1 SELECT DRIVE ONE
STB $95A AS THE DEFAULT DRIVE

```

Also remember that interrupts must be enabled whenever the disk system is being used. Otherwise, the disk drive motor will not shut off after two seconds of non-use. Most of the routines will automatically enable interrupts.

Listing 2 is a demonstration program, showing how the seven routines may be used. The program will allow you to type words on the screen. Press the Break key when you are done. The computer will now save the contents of the screen to disk under the name of DEMO/DAT. When you press Break again, the image will be loaded back in and put on the screen backwards. Press Break again, and the file DEMO/DAT will be killed and you will be returned to BASIC. Of course, this program has no real applications, but it does show the essential techniques for using the seven routines. I have included lots of comments to make it easier to understand.

If you have any questions, comments, or requests for future article topics, feel free to drop me a line at 2054 Manning Avenue, Los Angeles, Calif., 90025. Please include a self-addressed, stamped envelope. The source code for both listings is available from the author for five dollars at the above address. I'll supply it on tape to ease mailing, but it is readily transferable to disk.

Good luck, and may you input a character for each that you output.

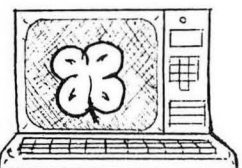
*(Roger Schrag, a highschool senior, enjoys working with the CoCo and writing for the Rainbow. He also designs and translates programs for Adventure International.)*

#### Listing 1

```

62000 *****
62010 * MACHINE LANGUAGE DISK I/O *
62020 *****
62030 *
62040 * VERSION 1.0 - MARCH 1, 1983
62050 *
62060 * ROGER SCHRAG
62070 * 2054 MANNING AVENUE
62080 * LOS ANGELES, CA 90025
62090 *
62100 *
62110 *THIS CODE IS INTENDED TO BE
62120 *APPENDED ON TO YOUR OWN
62130 *PROGRAM, SO YOU MUST SUPPLY
62140 *THE ORG STATEMENT. IT MAY
62150 *RESIDE ANYWHERE IN RAM

```



**16K EXT. COLOR BASIC & PRINTER REQUIRED**

**WORD SEARCH PUZZLE MAKER**

STANDARD \$6.95

DEFINITIONS \$6.95

WIDE \$6.95

BIG LETTERS \$6.95

SEQUENCE DRILL \$6.95

**MATH WORKSHEET-QUIZ MAKER**

WHOLE NUMBERS \$6.95

FRACTIONS \$6.95

DECIMALS \$6.95

PERCENTS \$6.95

LENGTH \$6.95

AREA \$6.95

VOLUME \$6.95

CAPACITY \$6.95

WEIGHT \$6.95

TIME \$6.95

SPEED \$6.95

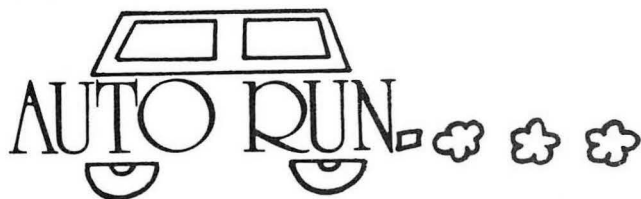
**Shamrock Software**

4382 NORTON ROAD  
PADNOR OHIO 43066  
614-494-2277

OHIO RES. ADD 5.5% SALES TAX

ANY 3 10% OFF    ANY 5 15% OFF    ANY 8 20% OFF    ANY 10 25% OFF





Auto Run is a utility program for the TRS-80\* Extended Basic Color Computer. It is used to add convenience and professionalism to your software.

Auto Run will help you create your title screen with the graphics editor. The graphics editor allows you to choose a background color and border style. Using the arrow keys and several other commands you can draw pictures, block letters and also include text.

Auto Run will generate a machine language loader program to precede your program on the tape. Then, to start up your program, simply type CLOADM to load in the Auto Run loader program, which will then automatically start itself up, display your title screen, load your program and then RUN or EXEC it.

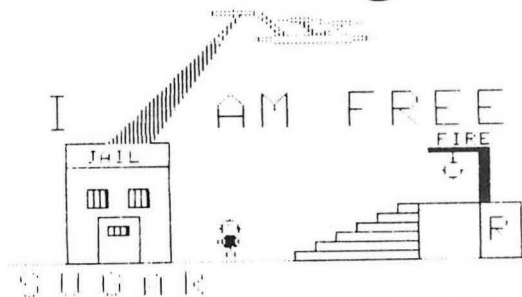
Also you may record a vocal or musical introduction preceding your program. The Auto Run loader will control the audio on/off.

Basic programs can be set to load anywhere in memory above \$600 (the PCLEAR 0 page).

Software authors: The Auto Run prefix may be appended to your software products.

Auto Run is **\$14.95** and includes complete documentation and an assembly source listing. Requires 16K Extended Basic.

## Galactic Hangman



A great new twist to the popular, educational word guessing game for the Color Computer. Large (700 words) and sophisticated vocabulary. Or enter your own words, your child's spelling list, foreign language vocabulary, etc.

Outstanding high resolution graphics, animation and sound effects.

For **\$14.95** you get both the 16K and 32K versions of Galactic Hangman.



\*TRS-80 is a trademark of Tandy Corp.



## Tape Information Management System

A user-oriented, easy to use personal database management system for the TRS-80\* Color Computer with these outstanding features:

- \*keeps files of programs, names, addresses, birthdays, recipes, class or club rosters, anything
- \*variable record and field lengths
- \*phrase substitution editor
- \*up to 8 user-definable fields
- \*ML sort (up to 3 fields), search and delete functions
- \*2 search modes — range and item
- \*user-definable printer format, for any printer
- \*up to 230 characters per record

For **\$24.95** you get the database management system, our full documentation which includes a reference guide and a programmer's guide, and our 1981 Bibliography of articles relating to the Color Computer. Requires 16K Extended Basic. 32K recommended.

**1982 TIMS Bibliography — \$9.95**

## Silly Syntax



A sensational and educational version of a popular party game for the TRS-80\* Color Computer . . .

For 1 to 10 players. Load a story into the computer. The players are asked to supply a noun, verb, part of body, celebrity, etc. which the program uses to complete the story. The story, which is displayed when all words are entered, will be hilarious. Silly Syntax requires 16K Extended Basic (32K for disk version). For **\$19.95**, you get a user guide and a tape containing the Silly Syntax game and 2 stories. You can create your own stories or order story tapes from the selection below.

**Silly Syntax stories — Ten stories per tape.**

- |                      |                           |
|----------------------|---------------------------|
| SS-001 - Fairy Tales | SS-004 - Current Events   |
| SS-002 - Sing Along  | SS-006 - Adventure/Sci-Fi |
| SS-003 - X-Rated     | SS-007 - Potpourri        |

Each story tape is **\$9.95**. 10% off for 3 or more story tapes. Disk is **\$24.95** for Silly Syntax and 2 stories or **\$49.95** for Silly Syntax and all 62 stories.

**SUGAR SOFTWARE**  
2153 Leah Lane  
Reynoldsburg, Ohio 43068  
(614) 861-0565

CIS orders EMAIL to 70405, 1374

Add \$1.00 per tape or disk for postage and handling. Ohioans add 5.5% sales tax. COD orders are welcome. Dealer inquiries invited.





```

63000 *THE VERIFICATION SYSTEM
63010 * B=1 (ACTIVATE)
63020 * B=0 (DEACTIVATE)
63030 *
63040 VERIFY LBSR BEGIN PREPARE
63050 STB $987 STORE STATUS
63060 LBRA DONE FUNCTION COMPLETE
63070 *
63080 *
63090 *THE ROUTINES BELOW ARE FOR
63100 *INTERNAL USE ONLY, AND ARE NOT
63110 *TO BE CALLED BY YOUR PROGRAM
63120 *DIRECTLY!
63130 *
63140 *
63150 *ROUTINE TO PROCESS FILENAME
63160 *
63170 FNAME LDB **FF CLEAR COUNTER
63180 GETLEN INCB 'CALCULATE HOW
63190 LDA B, X MANY LETTERS
63200 CMPA **20 ARE IN THE
63210 BCC GETLEN FILENAME
63220 CLR , -S MAKE SPACE ON STACK
63230 LDA $95A GET DEFAULT DRIVE # IN
63240 STA $EB CASE NONE IS SPECIFIED
63250 LDU **94C NAME STORAGE AREA
63260 LDA **20 ASCII CODE FOR BLANK
63270 CLEAR STA , U+ CLEAR OUT
63280 CMPU **957 FILENAME
63290 BNE CLEAR STORAGE AREA
63300 JMP $CBA4 GO PROCESS FILENAME
63310 *
63320 *
63330 *ROUTINE TO PREPARE EVERYTHING
63340 *PRESERVE REGISTERS, SET UP
63350 *ERROR TRAP, ETC
63360 *
63370 BEGIN PSHS X, Y, U, DP, A SAVE REGISTERS
63380 CLRA TEMPORARILY SET
63390 TFR A, DP DP TO ZERO
63400 LDA $1BE GET CONTENTS OF
63410 LDU $18F ERROR VECTOR
63420 STA SAVE, PCR AND SAVE IT
63430 STU SAVE+1, PCR FOR NOW
63440 LDA **7E NOW SET UP
63450 LEAU ERROR, PCR ERROR VECTOR
63460 STA $18E WITH OUR OWN
63470 STU $18F HANDLING ROUTINE
63480 LDA , S RESTORE A REGISTER
63490 STS STACK, PCR SAVE STACK POINTER
63500 JMP [B, S] RETURN
63510 *
63520 *
63530 *IF AN ERROR OCCURS, CONTROL
63540 *WILL PASS TO ERROR ROUTINE
63550 *
63560 ERROR LSRB B=ERROR CODE
63570 INCB DIVIDE BY 2, ADD 1
63580 BRA EXIT GO TO EXIT ROUTINE
63590 *
63600 *
63610 *IF ROUTINE FINISHES PROPERLY,
63620 *CONTROL WILL PASS TO DONE
63630 *
63640 DONE CLRB O=NO ERROR
63650 BRA EXIT GO TO EXIT ROUTINE
63660 *
63670 *
63680 *ROUTINE TO RESTORE REGISTERS AND
63690 *ERROR VECTOR, AND RETURN TO
63700 *CALLING PROGRAM
63710 *
63720 EXIT LDA SAVE, PCR RESTORE THE
63730 LDU SAVE+1, PCR ERROR VECTOR
63740 STA $18E TO ITS ORIGINAL
63750 STU $18F VALUE
63760 LDS STACK, PCR RESTORE STACK POINTER
63770 PULS A, DP, U, Y, X RESTORE REGISTERS
63780 LEAS 2, S CLEAN UP STACK
63790 TSTB SET Z FLAG IF NO ERROR
63800 RTS RETURN TO CALLER
63810 END START

```



**P. O. Box 14806  
Jacksonville, FL 32238  
904 777-1543**

Prices on All games include shipping. Florida Resident add 5% tax.

All Programs require Color ComPuter™ (Tandy Corp) or TDP System 100 ComPuter™ (RCA)

**ACROSS THE RUBICON 16K EXT or NON EXT** — The popular WWII wargame. Break thru the Huertgen Forrest using infantry, heavy and light tanks, air & artillery strikes, Paratroops. Graphics, terrain modifiers, unit designators and 5 minute conversion instructions for 16K NON EXT. State system when ordering. These games do not require EXTENDED BASIC.

**RUBICON II 32K EXT** Everything **ATR** has and more! Mortar units, Patrols, German Artillery, Platoon movement, realistic supply and intelligence, spotting rounds, unit merge, GAME SAVE \$24.95

**MISSION EMPIRE!** A strategic wargame/strategy game. Starting with one planet, incomplete intelligence and limited resources, you must conquer the rest of your galaxy. Play takes 2-5 hours and is DIFFERENT EVERY TIME! All versions offer GAME SAVE option. Specify 32K disc or 16K-The 32K versions require Extended Basic, the 16K does not.

**GALACTIC TAIPAN 16K EXT** — The merchant's of space, battle storms, pirates and high taxes in their search for trade and profit. These games do not require EXTENDED BASIC.

**ROMPAC BACKUP** — Can't run your ROMPACS with your disk in or just want backup? This program makes it easy. Requires 64K. Shipped on tape.

**Cassette** ..... **\$19.95**

**All games available on Disk** ..... **Add \$3.00**

Listing 2:

```

00100 *DEMONSTRATION PROGRAM
00110 *MACHINE LANGUAGE DISK I/O
00120 *BY ROGER SCHRAG
00130 *
00140 *
00150 ORG $1000 START ABOVE BUFFER AREA
00160 START LDB ##1 WE WANT 1 BUFFER
00170 JSR FILES SET UP MEMORY
00180 LDB ##1 ACTIVATE THE
00190 JSR VERIFY VERIFICATION SYSTEM
00200 JSR $A928 CLEAR SCREEN
00210 WAIT LDA ##FF RED GRAPHIC BLOCK
00220 STA [$88] SHOW CURSOR
00230 JSR [$A000] SCAN KEYBOARD
00240 BEQ WAIT WAIT UNTIL KEY PRESSED
00250 CMPA ##3 BREAK PRESSED?
00260 BEQ SAVEIT GO SAVE SCREEN IF SO
00270 LDB ##60 ERASE THE
00280 STB [$88] CURSOR
00290 JSR $A30A PRINT CHARACTER
00300 BRA WAIT LOOP BACK
00310 SAVEIT LDA ##60 ERASE THE
00320 STA [$88] CURSOR
00330 LDX #NAME ADDR OF NAME
00340 LDY ##1FF FILE TYPE: ASCII DATA
00350 LDA ##4F OUTPUT MODE
00360 LDB ##1 DEVICE NUMBER ONE
00370 JSR OPEN GO OPEN FILE
00380 BNE GOODFED GO IF ERROR
00390 LDX ##400 TOP OF SCREEN
00400 WRITE LDA ,X+ GET CHARACTER
00410 LDB ##1 DEVICE NUMBER ONE
00420 JSR PRINT WRITE CHARACTER
00430 BNE GOODFED GO IF ERROR

```

```

00440 CMPX ##600 END OF SCREEN?
00450 BNE WRITE LOOP BACK IF NOT
00460 LDB ##1 DEVICE NUMBER ONE
00470 JSR CLOSE CLOSE FILE
00480 BNE GOODFED GO IF ERROR
00490 JSR $A928 CLEAR SCREEN
00500 JSR BREAK WAIT FOR BREAK PRESSED
00510 LDX #NAME ADDR OF FILENAME
00520 LDY ##1FF FILE TYPE: ASCII DATA
00530 LDA ##49 INPUT MODE
00540 LDB ##1 DEVICE NUMBER ONE
00550 JSR OPEN GO OPEN FILE
00560 BNE GOODFED GO IF ERROR
00570 LDX ##600 END OF SCREEN
00580 READ LDB ##1 DEVICE NUMBER ONE
00590 JSR INPUT READ CHARACTER
00600 BNE GOODFED GO IF ERROR
00610 STA , -X PUT ON SCREEN
00620 CMPX ##400 TOP OF SCREEN?
00630 BNE READ LOOP BACK IF NOT
00640 LDB ##1 DEVICE NUMBER ONE
00650 JSR CLOSE GO CLOSE FILE
00660 BNE GOODFED GO IF ERROR
00670 JSR BREAK WAIT FOR BREAK PRESSED
00680 JSR $A928 CLEAR SCREEN
00690 LDX #NAME ADDR OF FILENAME
00700 JSR KILL DELETE FILE
00710 BNE GOODFED GO IF ERROR
00720 JSR $A928 CLEAR SCREEN
00730 JMP $A0F3 RETURN TO BASIC
00740 BREAK JSR [$A000] SCAN KEYBOARD
00750 CMPA ##3 BREAK KEY PRESSED?
00760 BNE BREAK WAIT MORE IF NOT
00770 RTS RETURN TO PROGRAM
00780 GOODFED LDX #ERRMSG MESSAGE "ERROR #"
00790 ERR1 LDA , X+ GET CHARACTER
00800 BEQ ERR2 GO IF DONE
00810 JSR $A30A PRINT CHARACTER
00820 BRA ERR1 LOOP BACK
00830 ERR2 LDA ##2F PRINT ERROR CODE
00840 ERR3 INCA NUMBER ON SCREEN
00850 SUBB ##0A IN TWO DIGIT
00860 BCC ERR3 DECIMAL FORMAT
00870 ADDB ##3A A=TENS B=ONES
00880 JSR $A30A PRINT TENS
00890 TFR B,A GET ONES
00900 JSR $A30A PRINT ONES
00910 JMP $A0F3 RETURN TO BASIC
00920 NAME FCC "DEMO/DAT"
00930 FCB $0 TERMINATOR
00940 ERRMSG FCC "ERROR #"
00950 FCB $0 TERMINATOR
00960 *
00970 *
00980 *THE DISK I/O PROGRAM HAS
00990 *BEEN APPENDED BELOW
01000 *
01010 *
01020 SAVE FCB $0 3 BYTE STORAGE
01030 FCB $0 AREA FOR THE
01040 FCB $0 ERROR VECTOR
01050 STACK FCB $0 2 BYTE STORAGE
01060 FCB $0 AREA FOR STACK POINTER
01070 *
01080 *
01090 *ROUTINE TO INITIALIZE DISK
01100 *SYSTEM'S MEMORY
01110 * B=NUMBER OF BUFFERS
01120 *
01130 FILES LBSR BEGIN PREPARE
01140 PSHS B SAVE # OF BUFFERS
01150 JSR $CA3B CLOSE ALL FILES
01160 PULS B RESTORE # OF BUFFERS
01170 STB $95B STORE # OF FILES
01180 LDU ##928 START OF BUFFER TABLE
01190 LDX ##989 START OF BUFFER AREA
01200 DOBUF CLR , X CLEAR STATUS FLAG
01210 STX , U++ PUT ENTRY IN TABLE
01220 LEAX $119, X GO TO NEXT BUFFER
01230 DECB DECREMENT COUNT
01240 BHI DOBUF LOOP BACK UNTIL DONE
01250 LBRA DONE FUNCTION COMPLETE
01260 *
01270 *
01280 *ROUTINE TO OPEN A FILE
01290 * X=ADDR OF FILENAME
01300 * Y=FILE TYPE
01310 * A=FILE MODE

```

# PAY WHAT YOU WANT

for home and business software  
RS CoCo and TDP-100

16/32K Disk or Cassette  
Extended Color Basic Required

## BUDGET RECORD

Income & outlay by 99 categories. Great for taxes. 32k.

## MAILING LIST

Makes labels, printouts and alphabetized lists. M/L sort.

## APPOINTMENT BOOK

Print a calendar with any number of memos/day. (32k. Requires printer with compressed characters)

## GRADE BOOK

Make rolls & grade sheets, complete with stats and totals.

## ALSO AVAILABLE

Phone Book, Sales Record, Car Repairs, Diet Delight, Grocery List.

### The Fine Print:

Order two programs maximum. Send shipping/handling in advance (1—\$4.00; 2—\$6.00). After using the program, pay only what the program is worth to you. Let's try applying right livelihood to the software industry!

Specify 16/32K and type of printer.

Bruck Associates  
6609 Westmoreland Ave.  
Takoma Park, MD 20912  
(301) 270-5822



Free catalogue on request





# NEW for your COLOR COMPUTER

## Switchable Expansion Is Here

### CoCo HAS A COMPANION!!

GOOD NEWS Switch over to more versatility with the new BT-2000 COMPANION. Save CoCo's connector with the best COMPANION it will ever have.


- Load 5 cartridges into the COMPANION and avoid the hassles while enjoying the benefits of push-button selection.
- Push a Button or select from your keyboard to turn on one of your 5 selections. Handy indicator lights let you know at a glance which cartridge is connected.
- No More Turn-Offs. Just switch to the next cartridge in your COMPANION. Push a button to Restart without turning off the power.
- Plug-in. Fill one to five slots for flexible programming, game playing or both. Choose ROM Packs, serial ports, parallel ports, or disk drives. Then do what you like to do best. The most powerful and cost effective expansion you will find for just \$249.95.

### FOR THE ADVANCED USER OR EXPERIMENTER

- The utmost in expansion power and versatility is the BT-1000 Expansion Interface Unit. \$270.00.
- Large Built-in power supply to power your peripherals and experimenter circuits.
- Space for your ML utilities with optional 8K of RAM. \$300.00



### ALSO NEW FROM BASIC TECHNOLOGY!!

- BT-1010 PPI Parallel Printer Interface. Free-up CoCo's serial port. Run your printer at top speed. Five foot cable with Centronics compatible connector and machine language printer driver are included. \$79.95.
- BT-1020 Real Time Clock/Calendar. Let CoCo keep the time and date for your programs and files. Day-light savings time and leap year keep you on time. Save data or program memory even when power is off with 50 bytes of battery backed memory. Alarm capability to turn on the coffee pot. All for only \$109.00. 
- BT-1030 VIP Versatile Interface Port. Connect CoCo to the outside world with two 8-bit parallel ports, two 16-bit timer/counters and a serial shift register. All user programmable. \$69.95.
- WRITE FOR FREE BROCHURE.

For years of trouble-free enjoyment all Basic Technology products use top quality components and are backed by a full 180 day parts and labor warranty. We service what we sell!!!

Add \$5 shipping & handling for BT-1000, \$2.50 for BT-1020. Michigan residents add 4% sales tax. Shipping & handling for residents of Canada, Hawaii, Alaska is \$10. Overseas orders add 15%. Check, money order, VISA, MC (give account no., expiration date, phone no.). Personal checks allow 2-3 weeks to clear. COD charge \$2 (requires certified check or money order).

**basic** Dept. Q P.O. Box 511 Ortonville, MI 48462  
**TECHNOLOGY** (313) 627-6146

*"Watch for more peripherals from  
Basic Technology."*

```

01320 * B=DEVICE NUMBER
01330 *
01340 OPEN LBSR BEGIN PREPARE
01350 STY $957 STORE TYPE
01360 PSHS D SAVE MODE & DEVICE
01370 LBSR FNAME PROCESS FILENAME
01380 PULS D RESTORE MODE & DEVICE
01390 JSR $C468 GO OPEN FILE
01400 LBRA DONE FUNCTION COMPLETE
01410 *
01420 *
01430 *ROUTINE TO CLOSE A FILE
01440 * B=DEVICE NUMBER
01450 *
01460 CLOSE LBSR BEGIN PREPARE
01470 STB $6F STORE DEVICE NUMBER
01480 JSR $CA53 GO CLOSE FILE
01490 LBRA DONE FUNCTION COMPLETE
01500 *
01510 *
01520 *ROUTINE TO WRITE TO A FILE
01530 * A=CHARACTER TO WRITE
01540 * B=DEVICE NUMBER
01550 *
01560 PRINT LBSR BEGIN PREPARE
01570 STB $6F STORE DEVICE NUMBER
01580 JSR $A282 WRITE CHARACTER
01590 LBRA DONE FUNCTION COMPLETE
01600 *
01610 *
01620 *ROUTINE TO READ A CHARACTER
01630 *FROM A FILE
01640 * B=DEVICE NUMBER
01650 * A RETURNS WITH INPUT CHARACTER
01660 *
01670 INPUT LBSR BEGIN PREPARE
01680 STB $6F STORE DEVICE NUMBER
01690 JSR $A176 GO INPUT CHARACTER
01700 STA ,S PUT IT ON STACK
01710 LBRA DONE FUNCTION COMPLETE
01720 *
01730 *
01740 *ROUTINE TO KILL A FILE
01750 * X=ADDR OF FILENAME
01760 *
01770 KILL LBSR BEGIN PREPARE
01780 LBSR FNAME PROCESS FILENAME
01790 JSR $C6C5 GO KILL FILE

```

```

01800 LBRA DONE FUNCTION COMPLETE
01810 *
01820 *
01830 *ROUTINE TO ACTIVATE/DEACTIVATE
01840 *THE VERIFICATION SYSTEM
01850 * B=1 (ACTIVATE)
01860 * B=0 (DEACTIVATE)
01870 *
01880 VERIFY LBSR BEGIN PREPARE
01890 STB $987 STORE STATUS
01900 LBRA DONE FUNCTION COMPLETE
01910 *
01920 *
01930 *THE ROUTINES BELOW ARE FOR
01940 *INTERNAL USE ONLY, AND ARE NOT
01950 *TO BE CALLED BY YOUR PROGRAM
01960 *DIRECTLY!
01970 *
01980 *
01990 *ROUTINE TO PROCESS FILENAME
02000 *
02010 FNAME LDB $$FF CLEAR COUNTER
02020 GETLEN INCB CALCULATE HOW
02030 LDA B,X MANY LETTERS
02040 CMPA $$20 ARE IN THE
02050 BCC GETLEN FILENAME
02060 CLR ,-S MAKE SPACE ON STACK
02070 LDA $95A GET DEFAULT DRIVE # IN
02080 STA $EB CASE NONE IS SPECIFIED
02090 LDU $$94C NAME STORAGE AREA
02100 LDA $$20 ASCII CODE FOR BLANK
02110 CLEAR STA ,U+ CLEAR OUT
02120 CMPU $$957 FILENAME
02130 BNE CLEAR STORAGE AREA
02140 JMP $C8A4 GO PROCESS FILENAME
02150 *
02160 *
02170 *ROUTINE TO PREPARE EVERYTHING
02180 *PRESERVE REGISTERS, SET UP
02190 *ERROR TRAP, ETC
02200 *
02210 BEGIN PSHS X,Y,U,DP,A SAVE REGISTERS
02220 CLRA TEMPORARILY SET
02230 TFR A,DP DP TO ZERO
02240 LDA $18E GET CONTENTS OF
02250 LDU $18F ERROR VECTOR
02260 STA SAVE,PCR AND SAVE IT
02270 STU SAVE+1,PCR FOR NOW
02280 LDA $$7E NOW SET UP
02290 LEAU ERROR,PCR ERROR VECTOR
02300 STA $18E WITH OUR OWN
02310 STU $18F HANDLING ROUTINE
02320 LDA ,S RESTORE A REGISTER
02330 STS STACK,PCR SAVE STACK POINTER
02340 JMP [B,S] RETURN
02350 *
02360 *
02370 *IF AN ERROR OCCURS, CONTROL
02380 *WILL PASS TO ERROR ROUTINE
02390 *
02400 ERROR LSRB B=ERROR CODE
02410 INCB DIVIDE BY 2, ADD 1
02420 BRA EXIT GO TO EXIT ROUTINE
02430 *
02440 *
02450 *IF ROUTINE FINISHES PROPERLY,
02460 *CONTROL WILL PASS TO DONE
02470 *
02480 DONE CLRB 0=NO ERROR
02490 BRA EXIT GO TO EXIT ROUTINE
02500 *
02510 *
02520 *ROUTINE TO RESTORE REGISTERS AND
02530 *ERROR VECTOR, AND RETURN TO
02540 *CALLING PROGRAM
02550 *
02560 EXIT LDA SAVE,PCR RESTORE THE
02570 LDU SAVE+1,PCR ERROR VECTOR
02580 STA $18E TO ITS ORIGINAL
02590 STU $18F VALUE
02600 LDS STACK,PCR RESTORE STACK POINTER
02610 PULS A,DP,U,Y,X RESTORE REGISTERS
02620 LEAS 2,S CLEAN UP STACK
02630 TSTB SET Z FLAG IF NO ERROR
02640 RTS RETURN TO CALLER
02650 END START

```

## C.C. DIALER



Let your Co. Co. do the "walking".

Turn your computer into an automatic telephone dialer.

Generate touch tones from C.C.'s keyboard or stored directory.

Save, load and modify directories on tape or disk.

Requires Extended Basic and Touch Tone phone service.

CASSETTE VERSION - \$29.95  
DISK VERSION - \$34.95

Send cheque or money order to:

CHRIS COMPUTERS  
6299 Alderwood Lane  
Delta, B.C. Canada V4E 3E7

(B.C. Residents include 6% Sales Tax)



# DO YOU HAVE A BASIC OR ASSEMBLY PROGRAM TO SELL?

... avoid unreliable cassette tapes and recorders  
and EPROM your program!

With EPACK, BASIC and assembly routines for color computer can be read from cassette tape and stored onto 2516, 2716 (single supply), 2732, 2532, 2564 and 2764 styled EPROM (21 and 25 volt). These EPROM are then inserted into MMB, a game packlike cartridge that automatically executes your program when it's inserted into the color computer ... just like the game packs.

EPACK is an excellent alternative to cassettes for programs you want to sell and for personal programs you would like to execute quickly and conveniently from a more reliable medium.

NOTE: 2732, 2764 and 21 volt capability are available optionally and are **not included** in the standard EPACK. \*\*

**EPACK consists of EPG, BROM and MMB for ..... \$150.00**

The units in EPACK are sold individually as follows:

## BROM

Utility fits any memory size color computer. Its function is to process BASIC source files into a format that can be written out to EPROM by Control Craft Inc.'s EPROM programmer (EPG) ... and still be executed by the BASIC interpreter - but from EPROM, not RAM!

**BROM ..... \$25.00**

## EPROM PROGRAMMER (EPG)

- Zero insertion force socket
- Personality plugs configure programmer to accept 2716 (5 volt supply), 2532 and 2564 style EPROM.
- Programmer's software is included on the programmer board as firmware.

- Program sources:
  - \* read cassette tape files into memory and then write file to EPROM (files are in Radio Shack format)
  - \* write color computer RAM to EPROM
  - \* read EPROM inserted in programmer into RAM
  - \* write color computer ROM to EPROM

- Functions:
  - \* test EPROM to see if it's unprogrammed
  - \* read an EPROM into color computer RAM
  - \* write RAM buffer out to EPROM
  - \* redefine the location of the RAM buffer
  - \* verify the programming of an EPROM
  - \* compare the contents of RAM buffer against an EPROM
  - \* edit the RAM buffer

1. Examine/change memory locations
  2. Examine/change start buffer address
  3. Fill RAM buffer with FF hex
- \* read blocks from a cassette file into RAM
  - Menu driven operation allows easy use
  - Plastic case enclosed circuitry
  - Gold plated edge connectors
  - Self-contained unit ... no external power supplies are used
  - Unit operates on any memory sized TRS-80 color computer

**EPG ..... \$105.00**

## MULTI MEMORY BOARD (MMB)

- Complete with support IC, sockets and decoupling capacitors
- Accepts 2516, 2716, 2532, 2732, 2564 EPROM (included in EPACK)
- Accepts 2016, 4016, 6116 static RAM\*
- Max capacity of 6 memory chips
- Runs on any size TRS-80 color computer
- Board is jumper addressable to either \$C000 or \$8000
- Provisions for write protect switch, or can jumper the board to write protect RAM

- Jumpers configure the memory type used on the board. Provisions for inserting DIP switches in place of the jumpers
- Gold plated edge connector
- Each IC or IC socket has decoupling cap installed
- Plastic case is available extra, at \$7.50 (pricing is subject to change without notice) (case included in EPACK)

\* RAM may not work with series E or later color computers.

**MMB ..... \$30.00**

**\*\* UPGRADE (optional for EPACK or EPG)**  
 2732-25 volt ..... \$15.00    2732-21 volt ..... \$15.00  
 2764-25 volt ..... \$15.00    2764-21 volt ..... \$15.00

## SDUMP

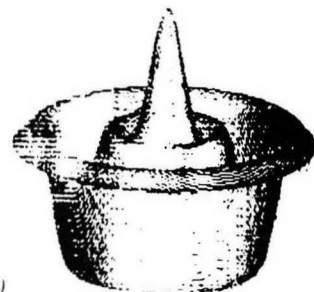
OKIDATA owners know that in order to print graphics they lose their serial interface ...

**NOT ANY MORE!**

Now you can print Hi-res Pmode 4 graphics images, full size and detail, on your OKIDATA, EPSON and other printers, without dot addressable capacity.

Features:

- Callable from BASIC routine
- Runs stand alone with a menu
- Relocatable
- Automatically finds the start of graphics pages
- Configurable for several printers
- Fast
- Useable on 16 or 32 or 64 K machines with or without Extended BASIC
- Documented



(OKIDATA, EPSON and RS are trademarks)

Actual graphics printed on an OKIDATA printer (shown reduced)

**SDUMP ..... \$20.00**

All prices subject to change without notice.

# CONTROL CRAFT INC.

19270 North Hills Drive • Brookfield, WI 53005 • (414) 784-9027

Name \_\_\_\_\_

Company \_\_\_\_\_

• Address \_\_\_\_\_

City/State \_\_\_\_\_ Zip \_\_\_\_\_

Shipping address (if different from above)

\_\_\_\_\_

\_\_\_\_\_

Order Form: EPACK \_\_\_\_\_ @ \$150.00 = \_\_\_\_\_  
 BROM \_\_\_\_\_ @ \$ 25.00 = \_\_\_\_\_  
 EPG \_\_\_\_\_ @ \$105.00 = \_\_\_\_\_  
 MMB \_\_\_\_\_ @ \$ 30.00 = \_\_\_\_\_  
 SDUMP \_\_\_\_\_ @ \$ 25.00 = \_\_\_\_\_  
 UPGRADE NO. \_\_\_\_\_ @ \$ 15.00 = \_\_\_\_\_

Wis. residents add 5% sales tax \_\_\_\_\_

Shipping & Handling: # of items \_\_\_\_\_ x \$2.00/item = \_\_\_\_\_

**TOTAL ORDER: \$ \_\_\_\_\_**

TO ORDER BY MAIL: SEND MONEY ORDER, CERTIFIED CHECK, CASHIERS CHECK, MASTERCARD/VISA (include card number, inter-bank number, expiration date and signature).

**DEALER INQUIRIES WANTED (minimum dealer order is 10 units)**

## Accounting Program Has Uses Beyond Tax Preparations

*CoCo-Accountant* is an inexpensive home accounting program from Federal Hill Software that allows the user to keep track of checks written. The object of the program is to allow for easy retrieval and sorting of this information at tax time from the files that may be kept on cassette or disk, depending on the version purchased. The cassette version comes in both 16K or 32K while the disk version may only be used with 32K.

I have had no training in accounting and thus I would have no idea how close this program adheres to regular accounting practices. Since I do take care of the finances for my family as well as the yearly chore of income tax, I do see how useful the information that may be generated from this program would be. The program will list and total each month's checks, list and total checks by account for a given month or year, and display all information on the screen or printer. In addition, the 32K versions will flag tax deductible expenses and checks subject to sales tax. In the latter case, the user need only type in the state's sales tax and the program will calculate the total amount of sales tax spent within these flagged purchases.

Getting the program set up and operating is easy due to very complete and well-written documentation (nine pages)

and a menu/prompt system built into the program itself. After loading the program for the first time, the user may define up to 24 accounts and a two-letter account code. The user may then enter check information from the keyboard or the storage medium. It is very important to remember each account's code or the program will not operate correctly. There is an option on the main menu that will list accounts and codes if the user forgets, but unfortunately you can't make a printed copy of this list. Other options from the main menu allow the user to list checks by month, account or payee, to make a year-to-date summary, to sort by date, correct an error, and list all checks. The printer routine supports a 45-column printout of any information wanted from most of the various "list" options.

I did find some limitations in the program that may limit the usefulness of the system for some users. The 32K disk version allows for up to 400 checks to be entered. I was surprised to discover that I write about 480 checks a year and that I would have to split the program into half-years to be able to use it. The cassette 32K version will take up to 450 checks and the 16K cassette version has a capacity of 200. This program is not a checkbook balancer as there is no way to enter credits or deposits. The documentation plainly states that the program is a way to organize *cancelled* checks only. If you like to balance your checkbook with your Color Computer, you will thus be obligated to enter your check information twice—once for your checkbook program and again for this program. Finally, the program is based around check writing only, and thus the reality of credit card or cash spending is not taken into account. I would suspect that organizing credit spending would be as important to some people as watching the checks.

Despite the limitations mentioned, I can see some excellent uses for a program such as *CoCo-Accountant*. Besides the obvious tax preparation advantages, an easily accessed record of, say, gasoline, energy or computer expenses would be useful for many people to watch where the money is going. When you measure the very reasonable price of this program against value received, I think value is the winner.

(Federal Hill Software, 825 William Street, Baltimore, MD 21230, 16K/32K cassette \$15.95, 32K disk \$21.95)

—Brian James

Graphics Hint . . .

## To 'B' or Not to 'B' That is the Option

The Extended BASIC book tells us to always use the B option directly before the M motion command when moving the draw position. Their reasoning is that you may get unwanted lines. My point here is that you may be able to omit the B option and get WANTED lines a lot easier than with any other method. I have used this method on several occasions and it can be of great help. It is useful anytime you need to draw a line from a point to another point that does not fall on one of the standard angles (U E R F D G L H). The N (no update) option also seems to work well with this method. I'm sure many people are aware of this ability, but I have never seen anything about it and it can be very helpful.

Harvey R. Hall  
Inola, OK

### INSIM Instruction Simulator

Simulates the complete 6809 instruction set.  
Use it to quickly debug assembly programs.  
Use it to find out how other programs work.  
Use it to find out how the basic roms work.  
Output to screen or printer.  
Includes commands to examine and change memory.  
Even has a mini-disassembler  
16K STANDARD/EXTENDED.....\$39.95

### COMPRESS Reduce basic program size.

Removes spaces and comments.  
4K OR 16K.....\$7.95

### INTRST1 The interest calculator

Calculates home mortgage payments or any loan payments.  
Calculates interest, total interest, total paid, amount due.  
Calculates how much to invest now to retire in style in 30 years.  
This program will calculate future values, present values and much more!  
16K STANDARD.....\$12.95

### DEPREC Calculate depreciation using:

Strait line, production unit, working hours, declining balance, sum-of-the-years digits.  
16K EXTENDED.....\$10.95

## B.C. ENGINEERING

P.O. BOX 768  
MANCHESTER, MO. 63011

SEND CHECK OR MONEY ORDER.  
MO. RESIDENTS ADD 5.625% SALES TAX.





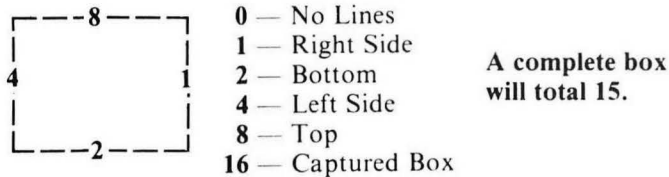
# Dots: A Change Of Pace From Outer Space

By Daniel W. Phillips

Here's a beginner strategy game that most everyone has played at one time or another. It's a change of pace from the outer space craze, and easy to play for even the younger kids. The computer allows no 'extra' moves or 'missed' captures. A nice feature of this electronic version of Dots is that the computer will start the game for you with 60 random lines. Of course, you can start from scratch if you like. Instructions for the game are in the program.

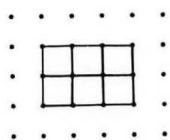
I've included a liberal sprinkling of *REMARKS* on the flow and control of the game in the listing, however, a little background information may be helpful if you want to make any changes or additions to the game.

The numbering scheme I used for this game appeared in a November 1982 *Popular Computing* article by George Stewart, titled Making Mazes. Values for the sides and box are as follows:



The value of the box is stored in the game array A(C,R), where "C" is the column and "R" is the row.

I used only two lines to make a box. The top and left side are the two lines used for computing values.



As you can see, the side of one box is also the opposite side of its adjacent box.

That is, the top of box 'A' is the same line as the bottom of box 'B'.



The value of both boxes must be revised when one line is drawn.

Although we are concerned only with values of the ten by ten boxes on the board, we need eleven columns and rows for drawing lines. Column eleven will draw the right side on the far right, and row eleven will draw the bottom line for the bottom boxes.

The search routines are simply a series of comparisons. The values chosen for comparison are sums of the line values for partially completed boxes. The order of comparison was arranged to equalize the time used for all searches. That is, instead of having a 'north' search zip along and a 'south' search barely crawl, both should take approximately the same length of time.

And that's about it!

### Variable List

|          |                                                       |
|----------|-------------------------------------------------------|
| LP,LH,LV | Left Joystick                                         |
| RP,RH,RV | Right Joystick                                        |
| H,V      | Gameboard Locations                                   |
| C,R      | Column and Row                                        |
| B        | Flag—Color of Player                                  |
| D        | Return Dot to Original Color Counter for Random Lines |
| F        | Flag to Indicate Capture                              |
| FP       | Flag for Joystick Control                             |
|          | Flag for Subroutine Returns                           |
| X,Y      | Work Variables                                        |
| SR,SL,ST | Scores                                                |
| A(11,11) | Game Array — Column — Row                             |
| NS(10)   | Work INKEY\$—Store Number Strings (not dimensioned)   |

|               |               |
|---------------|---------------|
| 79..... 0389  | 370..... 0EA9 |
| 169..... 0758 | 559..... 127A |
| 289.... 0AAD  | 739..... 1641 |
|               | END ... 1A16  |

The listing:

```

10 CLS:Pmode1,1:COLOR1,2:PCLS:PR
INT@205,"DOTS":PRINT@234,"WRITTE
N FOR":PRINT@263,"COLOR COMPUTER
BY":PRINT@297,"DAN PHILLIPS":PR
INT@451,"FOR INSTRUCTIONS PRESS
'I' ANY OTHER KEY TO PLAY
";
20 N$=INKEY$:IFN$=""THEN20 ELSE
IF N$="I" GOSUB740 ELSE CLS
30 PRINT@323,CHR$(175)" OR "CHR$(
239)" WILL BE RIGHT PLAYER":PRI
NT@355,CHR$(191)" OR "CHR$(255)"
WILL BE LEFT PLAYER"
39 REM STRINGS FOR NUMBERS
ORIGINALLY IN A PROGRAM BY

```

```

RON VAN DYKE IN THE APRIL 82
TRS 80 MICROCOMPUTER NEWS
40 N$(0)="BM+1,0;H1U4E1R2F1D4G1L
2;BM+6,0":N$(1)="BM+1,0;R1NR1U6G
1;BM+6,+5":N$(2)="NR4U1E1R1E2U1H
1L2G1;BM+7,+5"
50 N$(3)="BM+0,-1;F1R2E1H2E2H1L3
;BM+7,6":N$(4)="BM+3,0;U2NR1L3U1
E3D3;BM+4,3":N$(5)="BM+0,-1;F1R2
E1U2H1L3U2R4;BM+3,+6"
60 N$(6)="BM+4,-5;H1L2G1D4F1R2E1
U1H1L3;BM+7,+3":N$(7)="U1E4U1L4;
BM+7,+6":N$(8)="BM+1,-0;H1U1E1H1
U1E1R2F1D1G1NL2F1D1G1L2;BM+6,0"
70 N$(9)="BM+0,-1;F1R2E1U4H1L2G1
D1F1R2;BM+4,+3":N$(10)="D1R36U1
8"
79 REM LIST ALL VARIABLES IN
ORDER OF MOST USE..SET ARRAY
TO ZERO
80 DIM A(11,11):X=0:Y=0:RH=0:RV=
0:RP=0:LH=0:LV=0:LP=0:H=0:V=0:FP
=0:D=0:C=1:R=1:B=4:ST=0:SL=0:SR=
0:F=1:FOR R=1TO11:FOR C=1TO11:A(
C,R)=0:NEXT C,R
89 REM DRAW GAMEBOARD
90 DRAW"BM46,0"+N$(10):DRAW"BM11
0,0"+N$(10):DRAW"BM174,0"+N$(10)
:PAINT(1,1),1,1:GOSUB150:GOSUB16
0:COLOR2,1:FORX=48TO208 STEP16:F

```

```

ORY=20TO180 STEP16:PSET(X,Y,2):N
EXTY,X
100 FORX=1TO5:N$=INKEY$:NEXT:PRI
NT@419,"WOULD YOU LIKE SOME RAND
OM LINES TO GET STARTED?"
:PRINT@493,"<Y-N>";
110 N$=INKEY$:IFN$=""THEN110ELSE
X=RND(2)-1:SCREEN1,X
120 IFN$="Y"THENFP=-1:X=RND(-TIM
ER):GOSUB650:FP=1:GOTO180:ELSE 1
80
129 REM DRAW HORIZONTAL LINES
130 H=(C*16)+32:V=(R*16)+4:FOR X
=H TO (H+16):PSET(X,V,2):NEXTX:R
ETURN
139 REM DRAW VERTICAL LINES
140 H=(C*16)+32:V=(R*16)+4:FOR X
=V TO (V+16):PSET(H,X,2):NEXTX:R
ETURN
149 REM COMPUTE AND DISPLAY
SCORE FOR RIGHT PLAYER
150 X=INT(SR/10):Y=SR-(X*10):PAI
NT(178,2),3,1:DRAW"C2;S10;BM180,
14"+N$(X)+N$(Y):RETURN
159 REM COMPUTE AND DISPLAY
SCORE FOR LEFT PLAYER
160 X=INT(SL/10):Y=SL-(X*10):PAI
NT(50,2),4,1:DRAW"C2;S10;BM52,14
"+N$(X)+N$(Y):RETURN
169 REM ANY CHANGE IN SCORE -DO
ANOTHER SEARCH
170 IF ST<>(SR+SL) THEN 560
179 REM FLAGS TO START SEARCHES,
CHANGE PLAYERS - DISPLAY
NEW SCORES
180 IF F=-1 AND B=3 GOSUB150 ELS
E IF F=-1 AND B=4 GOSUB160
190 IF F=1 THEN IF B=3 THEN B=4
ELSE B=3
200 F=1:PAINT(116,8),B,1:SOUND20
0,5:IF ST=100 GOTO790
209 REM JOYSTICK INPUT
210 RH=INT(JOYSTK(0)/3)*8+40:RV=
INT(JOYSTK(1)/3)*8+12:RP=PEEK(65
280)
220 LH=INT(JOYSTK(2)/3)*8+40:LV=
INT(JOYSTK(3)/3)*8+12:LP=PEEK(65
280)
230 IF B=3 THEN H=RH:V=RV:FP=RP:
IF FP=125 OR FP=253 THEN FP=255:
GOTO250 ELSE GOTO250
240 H=LH:V=LV:FP=LP:IF FP=126 OR
FP=254 THEN FP=255
249 REM SET LOWER LIMIT FOR DOT
250 IF H<48 THEN H=48
260 IF V<20 THEN V=20
269 REM FLASH DOT AND SET TO
ORIGINAL COLOR BEFORE LEAVING
270 D=PPOINT(H,V):PSET(H,V,2):FO
RX=1TO40:NEXT:PRESET(H,V):FORX=1

```

# Q SOFT

## PRESENTS

### • 3D TIC-TAC-TOE •

NEW!! Over 150 possible ways to win. A real challenge. Just when you think you won, coco beats you to it. A first for the coco.

Cassette: 32K E.C.B. .... \$14.95  
Disc: 32K E.C.B. .... \$19.95

### • TIC-TAC-TOE •

If you thought Tic-Tac-Toe is an easy game, try matching your wits against this version. Play it with or without joysticks. A special "SMALL FRY" level of difficulty is provided.

Cassette: 16K C.B. .... \$10.95

### • JUMPS •

Q-SOFT's challenging version of a very old European solitaire game. An ADDICTIVE board game in HI-RES graphics. Reviewed in Jan. 1983 issue of the "RAINBOW" on page 164.

Cassette: 16K E.C.B. .... \$10.95  
Cassette: 4K C.B. .... \$ 8.95

### • THE SPIDER •

By: CHROMATIC SOFTWARE". All machine language. Annihilate the spider before he destroys you. Arcade action. Joysticks needed. Reviewed in Jan. 1983 issue of the "RAINBOW" on page 160.

Cassette: 16K ..... \$19.95

### • ONE CHECK •

48 "CHECKERS" are placed on the two outside rows of a standard checkerboard. Remove as many "checkers" as possible, jumping diagonally. Play with or without joysticks. HI-RES graphics.

Cassette: 16K E.C.B. .... \$10.95

### Q-SOFT

1006 ROBINHOOD DRIVE • PAINESVILLE, OHIO 44077  
C.O.D. orders add \$3.00 Call 216-352-2675







```

T030:NEXT:PSET(H,V,B):FORX=1T050
:NEXT:PSET(H,V,D):IF FP=255 OR F
P=127 THEN210
279 REM GET NUMBER OF COLUMN
AND ROW FROM DOT LOCATION
280 C=INT((H-32)/16):R=INT((V-4)
/16):IF C=0 THEN C=1
289 REM SET COLUMN AND ROW TO
LOW LIMIT
290 IF R=0 THEN R=1:REM NOV 1982
WRITTEN BY
DANIEL W. PHILLIPS
289 S. SHERIDAN ST.
WILKES-BARRE, PA.18702
299 REM CHECK FOR LEGAL MOVE
IN HORIZONTAL -IF NO LEGAL
MOVE CHECK VERTICAL
300 IF (H-40)/16=INT((H-40)/16) A
ND (V-12)/16<>INT((V-12)/16) AND
(PPOINT(H-3,V)=1 OR PPOINT(H-3,
V)=5) THEN FORX=(H-8) TO (H+8):P
SET(X,V,2):NEXT:ELSE GOTO320
309 REM ADD VALUE TO BOXES
ADJACENT TO HORIZONTAL LINE
310 A(C,R)=A(C,R)+8:A(C,R-1)=A(C
,R-1)+2:IF FP=-1 THEN RETURN ELS
E GOTO340
319 REM CHECK FOR LEGAL MOVE
IN VERTICAL - IF NO LEGAL

```

```

MOVE, MAKE NOISE AND GO
BACK TO JOYSTICKS
320 IF (H-40)/16<>INT((H-40)/16)
AND (V-12)/16=INT((V-12)/16) AND
(PPOINT(H,V-3)=1 OR PPOINT(H,V-
3)=5) THEN FOR X=(V-8) TO (V+8):
PSET(H,X,2):NEXT:ELSE SOUND100,5:
GOTO210
329 REM ADD VALUE TO BOXES
ADJACENT TO VERTICAL LINE
330 A(C,R)=A(C,R)+4:A(C-1,R)=A(C
-1,R)+1:IF FP=-1 THEN RETURN
339 REM CHECK THE ONLY THREE
BOXES THAT COULD BE CAPTURED
340 IF A(C,R)=15 GOTO380
350 IF A(C,R-1)=15 THEN R=R-1:GO
TO380
360 IF A(C-1,R)=15 THEN C=C-1:GO
TO380
369 REM NO CAPTURES
370 GOTO180
379 REM COLOR BOX WITH PLAYERS'
COLOR - PROTECT BOX FROM
BEING REUSED - ADD ONE TO
SCORE
380 X=(C*16)+40:Y=(R*16)+12:PAIN
T(X,Y),B,2:SOUND144,3:A(C,R)=16:
IF B=4 THEN SL=SL+1 ELSE SR=SR+1
390 IF FP=-1 THEN RETURN
399 REM FIND CONTINUED CAPTURES
400 IF A(C,R-1)=7 THEN R=R-1:GOS
UB130:GOTO310
410 IF A(C+1,R)=14 THEN C=C+2:GO
SUB140:FP=-1:GOSUB330:FP=1:IF A(
C-1,R)=15 THEN C=C-1:GOTO380
420 IF A(C,R+1)=13 THEN R=R+2:GO
SUB130:FP=-1:GOSUB310:FP=1:IF A(
C,R-1)=15 THEN R=R-1:GOTO380
430 IF A(C-1,R)=11 THEN C=C-1:GO
SUB140:GOTO330
440 IF A(C,R-1)=11 THEN R=R-1:GOS
UB140:GOTO330
450 IF A(C,R-1)=14 THEN C=C+1:R=
R-1:GOSUB140:GOTO330
460 IF A(C+1,R)=7 THEN C=C+1:GOS
UB130:GOTO310
470 IF A(C+1,R)=13 THEN R=R+1:C=
C+1:GOSUB130:GOTO310
480 IF A(C,R+1)=11 THEN R=R+1:GO
SUB140:GOTO330
490 IF A(C,R+1)=14 THEN C=C+1:R=
R+1:GOSUB140:GOTO330
500 IF A(C-1,R)=7 THEN C=C-1:GOS
UB130:GOTO310
510 IF A(C-1,R)=13 THEN C=C-1:R=
R+1:GOSUB130:GOTO310
520 IF A(C,R-1)=15 THEN R=R-1:GO
TO380
530 IF A(C+1,R)=15 THEN C=C+1:GO

```

## COMPUTER BUSINESS FORMS

Continuous forms, labels, paper, checks, invoices, statements—all with your imprint. Continuous letterhead with a perf so fine that you need a magnifying glass to tell it's a fan fold sheet. Matching envelopes.

Regular letterhead, business forms and cards also.

Send sample for quote. Send \$3.00 (refundable on first order) for our catalog.

Catalog also includes computer furniture.

### DESERT PRESS, INC.

P. O. Box 15128  
Las Vegas, Nevada 89114



# Elite·Calc™

NOW ... The worksheet calculator program you've been waiting for is waiting to work for you. ELITE·CALC™ is a powerful, full featured worksheet calculator designed especially for the Color Computer. Answer "what if" questions, prepare reports,

maintain records and perform other tasks that, until now, required sophisticated business computers. ELITE·CALC™ is a serious tool for those who want to do more than play games with their Color Computer.

## Features include:

- Single character commands
- Help Displays
- Enter text or formulas to 255 characters long
- Repeat text entries
- 255 maximum rows
- 255 maximum columns
- Available memory always displayed
- Rapid Entry modes for text and data
- Selectable Automatic Cursor movement
- Insert, Delete, Move entire rows or columns
- Replicate one cell to fill a row or column with selectable formula adjustment
- All machine language for speed
- Extended BASIC required for ROM routine calls
- Automatic memory size detection for 16K, 32K or 64K
- > 20K bytes, storage available in 32K systems
- BASIC style formulas
- Math Operators: +, -, X, /, [, (, ), =
- Relation Operators: =, >, <, <=, >=, <>
- Logic Operations: AND, OR, NOT
- Conditional Formula: IF ... THEN ... ELSE
- Trig Functions: SIN, COS, TAN, ATN

- ★ Easy to use
- ★ Individual cell formulas
- ★ Copy blocks of cells
- ★ Full cell-edit capability
- ★ Compatible with all printers
- ★ Graph format for bar charts
- ★ Sort in ascending or descending order
- ★ Comprehensive manual included

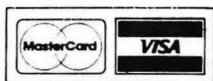
- Log Functions: LOG, EXP, SQR.
- Misc. Functions: INT, FX, ABS, SGN.
- Range Functions: SUM, AVERAGE, COUNT, MIN, MAX, LOOKUP
- Nine digit precision
- Definable constant table
- User definable printer set-up commands
- Individual column width settings
- Adjustable row height to insert blank lines without wasting memory
- Hide columns or rows
- Alternate print font selectable on cell by cell basis
- Display/Print formats set by cell, row, or column
- Dollar format, comma grouping; prefix or postfix sign
- Scientific notation, fixed point and integer formats
- Left and Right cell contents justification
- Full page formatting
- All formats stored with worksheet on disk(tape)
- Save & Load Disk(tape) files in compact memory form
- Scan disk directories
- Output ASCII file for word processor input compatibility
- Memory resident code ... no repeated disk calls
- Sample worksheets included

THE BEST FOR ONLY

**\$44<sup>95</sup>**

**Disk or Tape**

- Shipping from stock NOW
- Dealer Inquiries Invited.
- Add \$2 Postage & Handling
- PA residents add 6% sales tax



*Elite Software*

Box 11224 • Pittsburgh, PA 15238 • (412) 795-8492

From the creators of: ZAKSUND • COLOR TEXTSET I • COLOR TEXTSET II • INTER-GALACTIC FORCE • TEXT EDITOR • PARTY PAK • COLOR MONITOR • TREK-16 • WARKINGS • DISK & TAPE COPY • ANIMALS • BODY PARTS • TAPE COPY and many other fine programs

```

T0380
540 IF A(C,R+1)=15 THEN R=R+1:GO
T0380
550 IF A(C-1,R)=15 THEN C=C-1:GO
T0380
559 REM SET FLAGS TO GIVE THE
CURRENT PLAYER ANOTHER TURN
560 ST=(SR+SL):F=-1
569 REM SEARCH OF ENTIRE BOARD
570 FOR Y=1TO10:FOR X=1TO10
580 IF A(X,Y)=16 THEN NEXT X,Y:G
OTO170
590 IF A(X,Y)=7 THEN C=X:R=Y:GOS
UB130:GOTO310
600 IF A(X,Y)=14 THEN C=X+1:R=Y:
GOSUB140:GOTO330
610 IF A(X,Y)=13 THEN C=X:R=Y+1:
GOSUB130:GOTO310
620 IF A(X,Y)=11 THEN C=X:R=Y:GO
SUB140:GOTO330
630 IF A(X,Y)=15 THEN C=X:R=Y:FP
=-1:GOSUB380:FP=1:X=C:Y=R
640 NEXT X,Y:GOTO170
649 REM PUT RANDOM LINES ON THE
BOARD
650 Y=RND(10):X=RND(10)
660 FOR R=Y TO11:FOR C=X TO11:IF
R=11 AND C=11 THEN NEXTC,R:X=1:
Y=1:GOTO660
670 IF A(C,R)=0 AND A(C,R-1)=0 A

```

```

ND A(C-1,R)=0 THEN IF C=>R GOTO7
10 ELSE GOTO720
680 IF A(C,R)=0 THEN LP=A(C,R-1)
:LP=LP+1:ON LP GOTO 710,710,690,
690,710,700,690,700,710,700,690,
700,700
690 IF A(C,R)=8 THEN LP=A(C-1,R)
:LP=LP+1:ON LP GOTO 720,700,720,
700,720,700,700,700,720,700,700,
700,700
700 NEXTC,R:X=1:Y=1:GOTO660
710 IF C=11 THEN 715 ELSE GOSUB1
30:GOSUB310:GOTO730
714 REM SPECIAL CASE * VERTICAL
LINE FOR RIGHT SIDE OF BOARD
715 LP=A(C-1,R):IFLP=2 OR LP=4 O
R LP=8 THEN 720 ELSE 700
720 IF R=11 THEN 700 ELSE GOSUB1
40:GOSUB330
730 D=D+1:SOUND D,1:IF D=60 THEN
RETURN ELSE 650
739 REM PRINT INSTRUCTIONS
740 CLS:PRINT@46,"DOT":PRINT" TH
E OBJECT OF THE GAME IS TO CO
NNECT THE DOTS TO FORM AS MA
NY BOXES AS POSSIBLE WITHOUT LE
TTING YOUR OPPONENT CAPTURE AN
Y BOXES. THE PLAYER WHO COM- PL
ETES A BOX CAPTURES THAT BOX.";
750 PRINT" THE COMPUTER WILL THE
N SEARCH FOR ADDITIONAL CAPTUR
ES. EACH BOX COUNTS FOR ONE PO
INT. WHEN ALL CAPTURES ARE
MADE FOR A TURN, THE SCORE IS
UPDATED, AND THE PLAYER WILL D
RAW ONE MORE LINE.":PRINT@483
,"PRESS ANY KEY TO CONTIN
760 N$=INKEY$:IF N$=""THEN760 EL
SE CLS
770 PRINT@35,"A TONE WILL SOUND
WHEN...":PRINT@97,"A- AN ILLEGAL
MOVE IS ATTEMPTED B- THE DOT IS
BACK ON THE BOARD AFTER A SE
ARCH C- AS EACH CA
PTURED BOX IS FILLED WIT
H THE PLAYERS COLOR":PRI
NT@489,"PRESS ANY KEY";
780 N$=INKEY$:IF N$=""THEN 780 E
LSE PRINT@489,STRING$(13,CHR$(32
));:RETURN
789 REM SHOW BOARD AFTER FINAL
CAPTURE - THEN PLAY AGAIN
OR QUIT
790 FOR X=1TO2500:NEXTX:CLS:PRIN
T@205,"DOTS":PRINT@451,"FOR ANOT
HER GAME PRESS 'A' TO END
PRESS ANY KEY"
800 N$=INKEY$:IF N$=""THEN 800EL
SE IF N$="A" THEN RUN:ELSE END

```

## SOFTWARE-HARDWARE

FOR RADIO SHACK'S TRS-80 MODEL 1/3  
TRS-80 COLOR COMPUTER

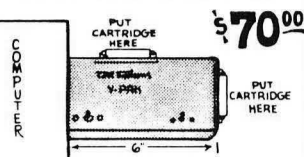
**•SEND FOR FREE CATALOG•**

### UTILITY PROGRAMS ON CASSETTE

SU-1 CASSETTE COPY \$ 10<sup>00</sup> **|| SPECIFY ||**  
SU-2 CASSETTE DUMP \$ 10<sup>00</sup> **|| COMPUTER ||**

### Y-PAK

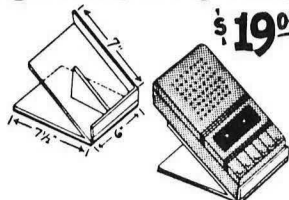
TRS-80 COLOR COMPUTER



\$ 70<sup>00</sup>

TURN YOUR COMPUTER INTO A  
2-SLOT SYSTEM. SWITCH  
BETWEEN THE TWO WITH EASE.

### RECORDER STAND



\$ 19<sup>00</sup>

MADE OF STURDY PLASTIC.  
HOLDS RECORDER AT A  
PERFECT ANGLE.

RAM/ROM USER-PAK FOR TRS-80 COLOR \$ 30

**•GAMES ALSO AVAILABLE•**

B.ERICKSON SOFTWARE·PO.BOX 11099·CHICAGO IL 60611

**CALL (312)276-9712 FOR INFORMATION**



# Telewriter-64™

## the Color Computer Word Processor

- **3 display formats: 51/64/85 columns × 24 lines**
- **True lower case characters**
- **User-friendly full-screen editor**
- **Right justification**
- **Easy hyphenation**
- **Drives any printer**
- **Embedded format and control codes**
- **Runs in 16K, 32K, or 64K**
- **Menu-driven disk and cassette I/O**
- **No hardware modifications required**

### THE ORIGINAL

Simply stated, Telewriter is the most powerful word processor you can buy for the TRS-80 Color Computer. The original Telewriter has received rave reviews in every major Color Computer and TRS-80 magazine, as well as enthusiastic praise from thousands of satisfied owners. And rightly so.

The standard Color Computer display of 32 characters by 16 lines without lower case is simply inadequate for serious word processing. The checkerboard letters and tiny lines give you no feel for how your writing looks or reads. Telewriter gives the Color Computer a 51 column by 24 line screen display with *true lower case characters*. So a Telewriter screen looks like a printed page, with a good chunk of text on screen at one time. In fact, more on screen text than you'd get with Apple II, Atari, TI, Vic or TRS-80 Model III.

On top of that, the sophisticated Telewriter full-screen editor is so simple to use, it makes writing fun. With single-letter mnemonic commands, and menu-driven I/O and formatting, Telewriter surpasses all others for user friendliness and pure power.

Telewriter's chain printing feature means that the size of your text is never limited by the amount of memory you have, and Telewriter's advanced cassette handler gives you a powerful word processor without the major additional cost of a disk.

*...one of the best programs for the Color Computer I have seen...*

— Color Computer News, Jan. 1982

### TELEWRITER-64

But now we've added more power to Telewriter. Not just bells and whistles, but major features that give you total control over your writing. We call this new supercharged version Telewriter-64. For two reasons.

### 64K COMPATIBLE

Telewriter-64 runs fully in any Color Computer — 16K, 32K, or 64K, with or without Extended Basic, with disk or cassette or both. It automatically configures itself to take optimum advantage of all available memory. That means that when you upgrade your memory, the Telewriter-64 text buffer grows accordingly. In a 64K cassette based system, for example, you get about 40K of memory to store text. So you don't need disk or FLEX to put all your 64K to work immediately.

### 64 COLUMNS (AND 85!)

Besides the original 51 column screen, Telewriter-64 now gives you 2 additional high-density displays: 64 × 24 and 85 × 24! Both high density modes provide all the standard Telewriter editing capabilities, and you can switch instantly to any of the 3 formats with a single control key command.

The 51 × 24 display is clear and crisp on the screen. The two high density modes are more crowded and less easily readable, but they are perfect for showing you the exact layout of your printed page, *all on the screen at one time*. Compare this with cumbersome "windows" that show you only fragments at a time and don't even allow editing.

### RIGHT JUSTIFICATION & HYPHENATION

One outstanding advantage of the full-width screen display is that you can now set the screen width to match the width of your printed page, so that "what you see is what you get." This makes exact alignment of columns possible and it makes hyphenation simple.

Since short lines are the reason for the large spaces often found in standard right justified text, and since hyphenation is the most effective way to eliminate short lines, Telewriter-64 can now promise you some of the best looking right justification you can get on the Color Computer.

### FEATURES & SPECIFICATIONS:

**Printing and formatting:** Drives any printer (LPVII/VIII, DMP-100/200, Epson, Okidata, Centronics, NEC, C. Itoh, Smith-Corona, Termet, etc).

Embedded control codes give full dynamic access to intelligent printer features like: underlining, subscript, superscript, variable font and type size, dot-graphics, etc.

Dynamic (embedded) format controls for: top, bottom, and left margins; line length, lines per page, line spacing, new page, change page numbering, conditional new page, enable/disable justification.

Menu-driven control of these parameters, as well as: pause at page bottom, page numbering, baud rate (so you can run your printer at top speed), and Epson font. "Typewriter" feature sends typed lines directly to your printer, and Direct mode sends control codes right from the keyboard. Special Epson driver simplifies use with MX-80.

Supports single and multi-line headers and automatic centering. Print or save all or any section of the text buffer. Chain print any number of files from cassette or disk.

**File and I/O Features:** ASCII format files — create and edit BASIC, Assembly, Pascal, and C programs, Smart Terminal files (for uploading or downloading), even text files from other word processors. Compatible with spelling checkers (like Spell 'n Fix).

Cassette verify command for sure saves. Cassette auto-retry means you type a load command only once no matter where you are in the tape.

Read in, save, partial save, and append files with disk and/or cassette. For disk: print directory with free space to screen or printer, kill and rename files, set default drive. Easily customized to the number of drives in the system.

**Editing features:** Fast, full-screen editor with wordwrap, block copy, block move, block delete, line delete, global search and replace (or delete), wild card search, fast auto-repeat cursor, fast scrolling, cursor up, down, right, left, begin line, end line, top of text, bottom of text; page forward, page backward, align text, tabs, choice of buff or green background, complete error protection, line counter, word counter, space left, current file name, default drive in effect, set line length on screen.

Insert or delete text anywhere on the screen without changing "modes." This fast "free-form" editor provides maximum ease of use. Everything you do appears immediately on the screen in front of you. Commands require only a single key or a single key plus CLEAR.

*...truly a state of the art word processor...  
outstanding in every respect.*

— The RAINBOW, Jan. 1982

### PROFESSIONAL WORD PROCESSING

You can no longer afford to be without the power and efficiency word processing brings to everything you write. The TRS-80 Color Computer is the lowest priced micro with the capability for serious word processing. And only Telewriter-64 fully unleashes that capability.

Telewriter-64 costs \$49.95 on cassette, \$59.95 on disk, and comes complete with over 70 pages of well-written documentation. (The step-by-step tutorial will have your writing with Telewriter-64 in a matter of minutes.) To order, send check or money order to:

Cognitec  
704 Nob Street  
Del Mar, CA 92014

Or check your local software store. If you have questions, or would like to order by Visa or Mastercard, call us at (619) 755-1258 (weekdays, 8AM-4PM PST). Dealer inquiries invited.

(Add \$2 for shipping. Californians add 6% state tax. Allow 2 weeks for personal checks. Send self-addressed stamped envelope for Telewriter reviews from CCN, RAINBOW, 80-Micro, 80-U.S. Telewriter owners: send SASE or call for information on upgrading to Telewriter-64. Telewriter-compatible spelling checker (Spell 'n Fix) and Smart Terminal program (Colorcom/E) also available. Call or write for more information.)

Apple II is a trademark of Apple Computer, Inc.; Atari is a trademark of Atari, Inc.; TRS-80 is a trademark of Tandy Corp; MX-80 is a trademark of Epson America, Inc.



# RAINBOW

Give us your best: Join the ranks of these courageous CoCoists in showing the Color Computer world your high score at your favorite micro-diversion. We want to put your best effort on record in *the Rainbow's* Scoreboard column. All entries must be received by the first of the month to be eligible for the following month's Scoreboard.

★ **New Number One**

☆ **Last Month's Number One**

| SCORE                        | PLAYER                                 | SCORE                      | PLAYER                                     | SCORE                     | PLAYER                               |  |  |
|------------------------------|----------------------------------------|----------------------------|--------------------------------------------|---------------------------|--------------------------------------|--|--|
| <b>ASTRO BLAST</b>           |                                        |                            |                                            |                           |                                      |  |  |
| 158,000                      | ★ Larry Plaxton, Medley, Alberta       | <b>COLOR SCARFMAN</b>      |                                            |                           |                                      |  |  |
| 92,000                       | ☆ Harry Sawyer, Watchung, NJ           | 976,520                    | ★ Bruce Thornhill, Barrhead, Alberta       | <b>GALACTIC ATTACK</b>    |                                      |  |  |
| 79,914                       | Jim Baker, Florissant, MO              | 539,100                    | Larry Plaxton, Medley, Alberta             | 54,200                    | ★ Mike Hughey, King George, VA       |  |  |
| 75,314                       | Mike Hall, Hartland, WI                | 523,340                    | Fred K. Herrman, Flemington, NJ            | 48,320                    | John Cole, King City, Ontario        |  |  |
| 71,000                       | Emil Hayek, State College, PA          | 506,560                    | ☆ Russ Eubanks, Jay, ME                    | 43,010                    | Brian Austin, Rotterdam, NY          |  |  |
| 64,000                       | Robert R. Franks, Jr., Toledo, OH      | 488,730                    | Del Alexander, San Antonio, TX             | 39,140                    | Greg Onlofsky, Ridgefield Park, NY   |  |  |
| 63,025                       | Russell Wronski, Palatine, IL          | 417,740                    | Danny Eldridge, Fair Oaks, CA              | 25,210                    | John & Krista McCallum, Woodburn, OR |  |  |
| <b>AVENGER</b>               |                                        |                            |                                            |                           |                                      |  |  |
| 14,075                       | ★ Stephen Lai, Palatine, IL            | 401,990                    | Cynthia Eldridge, Fair Oaks, CA            | 23,600                    | John McCallum, Woodburn, OR          |  |  |
| 11,560                       | ☆ Peter Niessen, Carlisle, MA          | <b>COLORPEDE</b>           |                                            |                           |                                      |  |  |
| 5,345                        | Craig Schubert, Newfoundland, NJ       | 2,139,248                  | ★ Mike Hall, Hartland, WI                  | 22,240                    | Daniel Milbrath, Ann Arbor, MI       |  |  |
| 5,000                        | Cameron Amick, Reisterstown, MD        | 2,005,227                  | ☆ Jennifer Maxey, Kalamazoo, MI            | 21,260                    | Brian Caulley, Reynoldsburg, OH      |  |  |
| <b>BERSERK</b>               |                                        |                            |                                            |                           |                                      |  |  |
| 22,050                       | ★ Jim Baker, Florissant, MO            | 1,329,868                  | Russ Eubanks, Jay, ME                      | 18,120                    | Lenny Munitz, Bellerose, NY          |  |  |
| 10,250                       | ☆ Mike Anheluk, Fall Creek, OR         | 1,104,029                  | Gary Ritchie, Bellevue, Alberta            | 17,310                    | Tyler Bolen, Wheaton, IL             |  |  |
| 10,070                       | Harry Sawyer, Watchung, NJ             | 684,117                    | David Blyn, Staten Island, NY              | 16,660                    | Jeff Willard, Chireno, TX            |  |  |
| 7,800                        | Mike Hall, Hartland, WI                | 539,941                    | Brian Hsu, Holmdel, NJ                     | <b>GALAX ATTAX</b>        |                                      |  |  |
| 6,150                        | Steve Skrzyniarz, Tacoma, WA           | 469,142                    | Michael Rader, Hardtner, KS                | 46,450                    | ★ Robert Rahmes, Silver Spring, MD   |  |  |
| <b>BUSTOUT</b>               |                                        |                            |                                            |                           |                                      |  |  |
| 34,700                       | ★ Sara Hennessey, Golden Valley, MN    | 386,506                    | Robert Rahmes, Silver Spring, MD           | 33,350                    | Aaron Cundiff, Livermore, KY         |  |  |
| 28,720                       | Perry Denton, New Baden, IL            | 323,946                    | Herbert Ponder, Jacksonville, FL           | 33,000                    | Todd Zuehl, Livermore, KY            |  |  |
| 25,510                       | ☆ Andy Klingler, San Diego, CA         | 317,361                    | Lyman Green, Jr., Ballouville, CT          | 30,350                    | Mark Raphael, Englishtown, NJ        |  |  |
| 5,942                        | Norbert Berenyi, Northvale, NJ         | 287,341                    | Robert Denton, New Baden, IL               | <b>GHOST GOBLER</b>       |                                      |  |  |
| <b>CANYON CLIMBER</b>        |                                        |                            |                                            |                           |                                      |  |  |
| 23,400                       | ★ Craig M. Arnold, Dallas, TX          | 206,558                    | Kim A. Cook, High Point, NC                | 825,250                   | ☆ Randy Gerber, Wilmette, IL         |  |  |
| <b>CATCH 'EM</b>             |                                        |                            |                                            |                           |                                      |  |  |
| 91,000                       | ☆ Dean Bouchard, Kingston, Nova Scotia | 173,904                    | Andrew Herron, High Point, NC              | 103,590                   | Harry Sawyer, Watchung, NJ           |  |  |
| 65,768                       | Laura Sandman, Louisville, KY          | <b>COLOR ZAP</b>           |                                            |                           |                                      |  |  |
| <b>CATERPILLAR</b>           |                                        |                            |                                            |                           |                                      |  |  |
| 30,029                       | ★ Ron Rhead, Willowdale, Ontario       | 227,330                    | ☆ Ron Rhead, Willowdale, Ontario           | 58,270                    | Mike Hall, Hartland, WI              |  |  |
| <b>CAVE HUNTER</b>           |                                        |                            |                                            |                           |                                      |  |  |
| 42,600                       | ☆ Gary Ritchie, Bellevue, Alberta      | <b>COLOUR PAC ATTACK</b>   |                                            |                           |                                      |  |  |
| 26,300                       | Mike Hughey, King George, VA           | 472,465                    | ★ Jim Baker, Florissant, MO                | 49,880                    | Steven Picone, Leomister, MA         |  |  |
| 21,150                       | Jim Baker, Florissant, MO              | 193,000                    | ☆ Cameron Amick, Reisterstown, MD          | <b>INVADERS REVENGE</b>   |                                      |  |  |
| <b>CLOWNS &amp; BALLOONS</b> |                                        |                            |                                            |                           |                                      |  |  |
| 65,050                       | ★ Brian Gould, Basking Ridge, NJ       | 51,150                     | Emil Hayek, State College, PA              | 32,600                    | ☆ Harry Sawyer, Watchung, NJ         |  |  |
| 61,700                       | ☆ Dan Dowling, San Bruno, CA           | 27,500                     | David Rosicky, Pittsburgh, PA              | <b>INVASION</b>           |                                      |  |  |
| 46,930                       | Stephen Shotts, Blacksburg, VA         | <b>CONQUEST OF KZIRGLA</b> |                                            |                           |                                      |  |  |
| 42,430                       | Joanne Ledson, North Bay, Ontario      | 10,399                     | ☆ Scott Sehlhorst, Columbia, SC            | 82,000                    | ☆ Harry Sawyer, Watchung, NJ         |  |  |
| 25,450                       | Norbert Berenyi, Northvale, NJ         | <b>DEFENSE</b>             |                                            |                           |                                      |  |  |
| 22,700                       | Shelley Partridge, Warkworth, Ontario  | 58,900                     | ☆ Greg Scott, Orlando, FL                  | <b>KATERPILLAR ATTACK</b> |                                      |  |  |
| <b>COLOR HAYWIRE</b>         |                                        |                            |                                            |                           |                                      |  |  |
| 14,650                       | ★ Todd C. Hauschildt, Red Wing, MN     | <b>DOODLE BUG</b>          |                                            |                           |                                      |  |  |
| 14,350                       | Mike Hughey, King George, VA           | 825,000                    | ★ John Cole, King City, Ontario            | 14,375                    | ★ Norbert Berenyi, Northvale, NJ     |  |  |
| 10,900                       | John Cole, King City, Ontario          | 355,440                    | Bette Munitz, Bellerose, NY                | 12,703                    | ☆ Warren Schubert, Newfoundland, NJ  |  |  |
| 10,450                       | Brian Austin, Rotterdam, NY            | 343,000                    | Mike Hughey, King George, VA               | 12,544                    | Todd C. Hauschildt, Red Wing, MN     |  |  |
| 10,250                       | ☆ Pat Downard, Louisville, KY          | 338,590                    | Joanne Ledson, North Bay, Ontario          | 12,100                    | Peter Stumpfli, McHenry, IL          |  |  |
| <b>COLOR INVADERS</b>        |                                        |                            |                                            |                           |                                      |  |  |
| 166,425                      | ★ Jim Baker, Florissant, MO            | 294,930                    | Stephen Lai, Palatine, IL                  | 9,137                     | Ron Rhead, Willowdale, Ontario       |  |  |
| 126,350                      | Perry Denton, New Baden, IL            | 260,000                    | Jeff Pyne, Port Mouton, Nova Scotia        | <b>THE KING</b>           |                                      |  |  |
| 101,240                      | Larry Plaxton, Medley, Alberta         | 45,580                     | Mrs. Sandy Nierste, Clio, MI               | 1,858,000                 | ★ Mike Hughey, King George, VA       |  |  |
| 83,000                       | ☆ Cameron Amick, Reisterstown, MD      | <b>DOUBLEBACK</b>          |                                            |                           |                                      |  |  |
| <b>COLOR METEORIDS</b>       |                                        |                            |                                            |                           |                                      |  |  |
| 252,050                      | ★ Larry Plaxton, Medley, Alberta       | 89,840                     | ★ Craig M. Arnold, Dallas, TX              | 1,000,000                 | ★ Debbie Purdy, Dearborn, MI         |  |  |
| 206,000                      | Peter Johnson, Chino, CA               | 50,110                     | ☆ Mary H. Thomas, Louisville, KY           | 1,009,400                 | ☆ Andrew Herron, High Point, NC      |  |  |
| 197,400                      | John Scannell, Renton, WA              | 43,660                     | Ron Moore, Wellsville, OH                  | 1,000,500                 | Wendy Johnson, San Jose, CA          |  |  |
| 153,000                      | Steve Lewallen, Centerville, OH        | 27,680                     | Andrea L. Herron, High Point, NC           | 626,400                   | Grant Gillott, Calgary, Alberta      |  |  |
| 149,000                      | ☆ Cameron Amick, Reisterstown, MD      | <b>DUNKEY MUNKEY</b>       |                                            |                           |                                      |  |  |
| <b>THE FROG</b>              |                                        |                            |                                            |                           |                                      |  |  |
| 15,400                       | ★ Debbie Purdy, Dearborn, MI           | 1,618,800                  | ★ Bryan Bloodworth, Federal Way, WA        | 508,000                   | Peter Niessen, Carlisle, MA          |  |  |
| <b>FROG TREK</b>             |                                        |                            |                                            |                           |                                      |  |  |
| 10,370                       | ★ Jim Baker, Florissant, MO            | 1,099,400                  | ☆ Andrew Herron, High Point, NC            | 333,300                   | Robert Denton, New Baden, IL         |  |  |
| 7,160                        | ☆ Mike Anheluk, Fall Creek, OR         | 1,000,001                  | Wendy Johnson, San Jose, CA                | 308,000                   | Rob Uriano, Framingham, MA           |  |  |
| <b>MEGA-BUG</b>              |                                        |                            |                                            |                           |                                      |  |  |
| 13,783                       | ★ Donald Habben, Morrison, IL          | 626,400                    | Peter Niessen, Carlisle, MA                | 12,236                    | ☆ Claude Malepart, Montreal, Quebec  |  |  |
| 11,886                       | ☆ John Tiffany, Washington, D.C.       | 508,000                    | Robert Denton, New Baden, IL               | 11,886                    | John Tiffany, Washington, D.C.       |  |  |
| 10,628                       | John Yapp, Park Forest, IL             | 333,300                    | Rob Uriano, Framingham, MA                 | 10,250                    | Benjy Nicholls, Lincoln, NE          |  |  |
| 10,250                       | Benjy Nicholls, Lincoln, NE            | 308,000                    | Mitch Cohen, Framingham, MA                | 9,049                     | Brian Louis, Streator, IL            |  |  |
| 9,049                        | Brian Louis, Streator, IL              | 238,100                    | <b>KOSMIC KAMIKAZE</b>                     |                           |                                      |  |  |
| 9,019                        | Scott Little, Somers, IA               | 231,400                    | 49,900 ☆ Mark Raphael, Englishtown, NJ     |                           |                                      |  |  |
| 8,535                        | Pete McCallum, Woodburn, OR            | 167,200                    | <b>MEGA-BUG</b>                            |                           |                                      |  |  |
| 8,313                        | Chizuru Gannon, Eilson AFB, AK         | 131,200                    | 13,783 ☆ Donald Habben, Morrison, IL       |                           |                                      |  |  |
| 7,973                        | Christine Hoff, Decatur, IL            | 118,800                    | 12,236 ☆ Claude Malepart, Montreal, Quebec |                           |                                      |  |  |
| 5,991                        | Shizuka Gannon, Eilson AFB, AK         | 110,000                    | 11,886 ☆ John Tiffany, Washington, D.C.    |                           |                                      |  |  |



# SCOREBOARD

## SCORE PLAYER

## SCORE PLAYER

## SCORE PLAYER

### METEORS

17,810 ★ Lenny Munitz, Bellerose, NY

### MICROBES

259,700 ☆ Sheila Coleman, Griffin, GA  
 88,120 Kevin Little, Somers, IA  
 80,400 Ken Miller, Yardley, PA  
 63,570 Greg Scott & Greg Shields, Orlando, FL  
 59,330 Cathie Habben, Morrison, IL  
 44,750 Daniel Milbrath, Ann Arbor, MI

### MR. MUNCH

24,680 ☆ Alan Mack, Penn Yan, NY

### MONKEY KONG

1,028 ★ Larry Plaxton, Medley, Alberta  
 963 ☆ Mark Dowling, San Bruno, CA

### MONSTER MAZE

60,000 ★ Brian Austin, Rotterdam, NY  
 53,130 Michael Partridge, Warkworth, Ontario  
 30,000 ☆ Claude Malepart, Montreal, Quebec  
 9,590 John Tiffany, Washington, D.C.

### NIBBLER

14,910 ★ Christal Giovinsky, Staten Island, NY

### OFFENDER

965,400 ★ Jim Baker, Florissant, MO

### PAC ATTACK

88,450 ★ Matthew Brenengen, Lake Elmo, MN  
 31,635 Tyler Bolen, Wheaton, IL  
 30,650 Peter Niessen, Carlisle, MA

### PAC-DROIDS

577,140 ★ Richard Cochrane, Wayne, NJ  
 140,300 John Yapp, Park Forest, IL  
 48,640 ☆ Murray Schechter, New York, NY  
 47,000 Robert M. Russo, Marriotsville, MD  
 41,380 Benjy Nicholls, Lincoln, NE  
 38,060 Percy Butler, Canton, ME  
 36,900 Jack Rains, Montreal, Quebec  
 36,000 Wayne G. Perry, Charlottesville, VA  
 29,500 Richard D. Gordley, Castleton, IL

### PACET-MAN

5,000 ☆ Cameron Amick, Reisterstown, MD  
 3,392 ★ Norbert Berenyi, Northvale, NJ

### PHANTOM SLAYER

180 ☆ Mike Hall, Hartland, WI

### PINBALL

66,650 ☆ Ken Miller, Yardley, PA

### PLANET INVASION

286,075 Larry Plaxton, Medley, Alberta  
 257,900 Ron Rhead, Willowdale, Ontario  
 221,350 John Cole, King City, Ontario  
 207,150 Mike Hughey, King George, VA  
 74,350 Benjy Nicholls, Lincoln, NE  
 69,500 Jeff Pyne, Port Mouton, Nova Scotia  
 68,650 Robert Rahmes, Silver Spring, MD

### POLARIS

151,154 ★ Brian Austin, Rotterdam, NY  
 101,000 ☆ James Quadarella, Brooklyn, NY  
 98,500 John Cole, King City, Ontario  
 59,522 John Yapp, Park Forest, IL  
 57,500 Scott Little, Somers, IA  
 49,737 Mike Hall, Hartland, WI  
 49,247 Ron Rhead, Willowdale, Ontario  
 45,541 Brad Behrendt, Vermillion, OH

### POLTERGEIST

4,956 ☆ Mark Dowling, San Bruno, CA  
 4,745 Bette Munitz, Bellerose, NY  
 4,455 Ken Miller, Yardley, PA

### POPCORN

110,570 ☆ Cameron Amick, Reisterstown, MD  
 56,000 James Quadarella, Brooklyn, NY

### PROTECTORS

358,514 ☆ Cameron Amick, Reisterstown, MD  
 154,967 Frankie Jimenez, Mesa, AZ  
 94,000 Gerry Schechter, Yonkers, NY

### RAIL RUNNER

38,360 ★ Jim Baker, Florissant, MO  
 13,195 Lenny Munitz, Bellerose, NY

### ROBOTTACK

1,197,800 ★ Brian Austin, Rotterdam, NY  
 939,300 Robert Kiser, Monticello, MS  
 702,200 Stephen Lai, Palatine, IL  
 527,700 Richard Slapp, Lake Elmo, MN  
 523,010 Steve Lewallen, Centerville, OH  
 358,300 Emil Hayek, State College, PA  
 255,800 Sam Heitz, Chicago, IL  
 213,870 Carol Wierzba, Southgate, MI

### SHOOTING GALLERY

28,500 ★ Kenneth Partridge, Warkworth, Ontario  
 16,370 Saul Munitz, Bellerose, NY

### SHUTTLE SIMULATOR

565 ☆ John W. Fraysse, Dahlgren, VA

### SKIING

40.10 ★ Fred K. Herrmann, Flemington, NJ  
 49.43 John Scanlan, Prairie Village, KS  
 52.22 Peter Johnson, Chino, CA  
 1:12.11 Benjy Nicholls, Lincoln, NE  
 1:13.13 Norbert Berenyi, Northvale, NJ  
 1:13.17 Donald Habben, Morrison, IL  
 1:13.40 Daniel Milbrath, Ann Arbor, MI

### SKY DEFENSE

6,700 ☆ Mike Anheluk, Fall Creek, OR  
 6,120 Steve Skrzyniarz, Tacoma, WA  
 5,200 Cameron Amick, Reisterstown, MD

### SOLO POOL

103 ☆ John W. Fraysse, Dahlgren, VA

### SPACE ASSAULT

238,580 ★ John Cole, King City, Ontario  
 157,140 David Milbrath, Ann Arbor, MI  
 156,650 ☆ Nathan Miller, Portland, OR  
 135,080 Brian Austin, Rotterdam, NY  
 122,230 Robert Lighthearth, Ellwood City, PA  
 105,000 Rodney Garner, Denton, NC  
 66,870 Fred K. Herrmann, Flemington, NJ  
 54,280 John Yapp, Park Forest, IL  
 36,930 Tyler Bolen, Wheaton, IL  
 33,100 Brian Gould, Basking Ridge, NJ  
 29,270 Todd Little, Somers, IA

### SPACE INVADERS

62,300 ☆ Peter Niessen, Carlisle, MA

### SPACE RACE

59,825 ★ Jim Baker, Florissant, MO  
 58,100 John Cole, King City, Ontario  
 31,525 ☆ Gregg Scott, Orlando, FL  
 4,000 Danielle Gardner, Louisville, KY

### SPACE SHUTTLE

594 ☆ Steve Schweitzer, Sewell, NJ  
 511 Larry Reitz, Toledo, OH

### SPACE WAR

400,190 ★ Mark Felps, Bedford, TX  
 116,000 ☆ Peter Niessen, Carlisle, MA  
 52,380 Jim Baker, Florissant, MO

### STARBASE ATTACK

21,628 ☆ Mark Raphael, Englishtown, NJ

### STARBLASTER

408,245 ☆ Mark Dowling, San Bruno, CA  
 325,790 Mike Anheluk, Fall Creek, OR  
 126,135 Mike Hall, Hartland, WI  
 80,001 Alan Lewis, Ridgefield, CT

### STARFIRE

2,102,450 ☆ Dean Bouchard, Kingston, Nova Scotia  
 1,320,150 Joy Bailey, Lexington, NC  
 1,120,000 Emil Hayek, State College, PA  
 698,200 Robert E. Courts, Batonia, OH  
 618,400 Peter Stumpf, McHenry, IL  
 563,200 Daniel Milbrath, Ann Arbor, MI

### STARSHIP CHAMELEON

72,600 ★ Jim Baker, Florissant, MO  
 68,500 ☆ Cameron Amick, Reisterstown, MD  
 64,800 David Rosicky, Pittsburgh, PA

### STORM

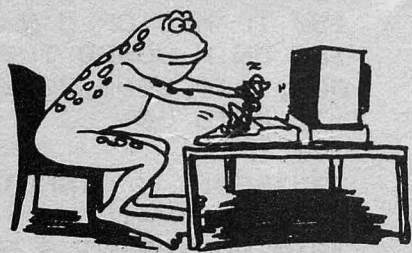
723,335 ☆ Chris Sweet, Harvard, MA  
 472,320 John Jaworski, Nashua, NH  
 380,000 Cameron Amick, Reisterstown, MD  
 240,745 Todd C. Hauschildt, Red Wing, MN  
 193,965 Mike Hall, Hartland, WI

### VENTURER

2,152,150 ☆ Greg Scott, Orlando, FL  
 1,769,400 Todd C. Hauschildt, Red Wing, MN  
 1,526,200 Peter Niessen, Carlisle, MA  
 803,100 Emil Hayek, State College, PA  
 344,550 Steve Skrzyniarz, Tacoma, WA

### ZAXXON

401,900 ★ Mike Hughey, King George, VA  
 81,800 ☆ Matt Cox, Roseville, CA  
 78,190 Steve Skrzyniarz, Tacoma, WA  
 74,136 Rod Moore, Wellsville, OH  
 65,600 Debbie Purdy, Dearborn, MI  
 57,200 John Scannell, Renton, WA



# STATS

By Edward R. Carson

This program was written to assist all of us Little League coaches who have spent hours after each game writing down each players' at bats, hits, runs, etc., trying to figure out all the averages. Well, here is a program to do it for you.

*Stats* will keep track of at bats, hits, runs, walks, strike outs and batting average. For the pitchers it tracks innings pitched, earned runs, hits, strikeouts, walks and earned run average.

There is space for 15 players. In the pitching program there is space for seven pitchers.

The program is easy to use and the menus are self-explanatory. But, you must input all players' names first or zeros will be entered in place of the name.

As you are entering the statistics, you will hear a warning tone as you go from one set of statistics to the next. I found this helpful as I went through the scoreboard with my head down.

On a 16K, ECB, *CLOAD* "STAT" then *PCLEAR* I and *RUN*.

I am looking forward to having *Stats* help me this year; I hope it can help you, also.



The listing:

|               |               |
|---------------|---------------|
| 1020 ... 02B1 | 9100 ... 118E |
| 3080 ... 0441 | 9370 ... 1339 |
| 3340 ... 0623 | 9640 ... 14E2 |
| 5010 ... 07C5 | 9890 ... 1689 |
| 5086 ... 0A27 | 10060 .. 1926 |
| 7095 ... 0C34 | 10215 . 1ACF  |
| 8230 ... 0E0E | 10370 ..1C3F  |
| 8530 .. 0FFC  | 10540 .1DCD   |
|               | END ... 1F65  |

```

5 CLEAR 1500:CLS
10 :DIM PL$(20),AB$(20),HT$(20)
,R$(30),K$(20),BB$(20),AV(20)
12 ::
15 'LITTLE LEAGUE STATS
20 'BY ED CARSON,3/15/83
22 :
30 CLS:PRINTTAB(8) "BASEBALL STA
TS"
35 PRINT STRING$(32,"*")

```

(Mr. Carson is a chief operator and instructor for the Tinken Company in Columbus, Ohio. He and his wife, Marilyn, have three sons. Mr. Carson has spent the last 16 years of his spare time coaching baseball, was president of the Centerburg Little League, and is now secretary-treasurer of the Tri-County Babe Ruth league.)

```

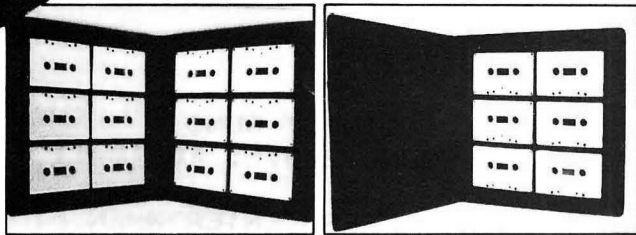
50 PRINT @ 102,"(1)INPUT PLAYERS
"
60 PRINT @134,"(2)ADD TO LIST"
70 PRINT @166,"(3)INPUT STATS"
80 PRINT @198,"(4)PRINT ALL PLAY
ERS"
90 PRINT @230,"(5)PRINT STATS"
100 PRINT@262,"(6)SAVE TO TAPE"
110 PRINT@294,"(7)LOAD FROM TAPE
"
120 PRINT@326,"(8)ADD TO STATS"
121 PRINT@358,"(9)PITCHERS
130 PRINT @427,"WHICH"
135 PRINT@459,"(1-9)"
140 INPUT M
150 IF M<0 OR M>9 THEN 30
160 ON M GOSUB 1000,1055, 3000,4
000,5000,6000,7000,8000,9000
170 GOTO 30
190 :
995 REM: INPUT PLAYERS
1000 CLS:Y=1
1010 CLS:PRINT @ 8,"INPUT/ADD PL
AYERS"
1020 PRINT @34,"PRESS<ENTER>WHEN

```



# NEW

## ELIMINATE THE CLUTTER

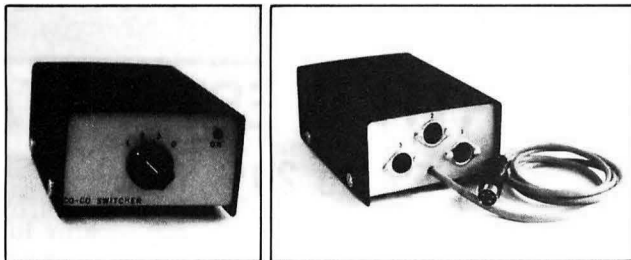


### THE ORGANIZER ALBUMS TO HOLD YOUR CASSETTES

Store and organize your cassette library. The Organizer is constructed of black vinyl with rigid molded plastic frame to prevent crushing. Label holder welded on the spine for quick identification of contents. Order albums filled with BASF-DPS, C-10 tapes and get an even better deal!

| Item                       | Price   |
|----------------------------|---------|
| Organizer-12 with Tapes    | \$12.95 |
| Organizer-12 without Tapes | \$6.95  |
| Organizer-6 with Tapes     | \$8.95  |
| Organizer-6 without Tapes  | \$4.95  |

Shipping: \$2.00 for first item, + \$.50 for each additional item.



### THE COCO-SWITCHER A QUALITY PIECE OF HARDWARE

The CoCo Switcher allows you to hook up three peripherals to your RS-232 jack. Connect your modem, printer and any other RS-232 compatible peripheral to the CoCo Switcher. Select among these peripherals at the flick of a switch on the front of the CoCo Switcher or turn them all off. No more scrambling around behind your computer. No more risk of harming your computer's RS-232 port. An LED on the CoCo Switcher shows if your computer is on or off at a glance.

The CoCo Switcher is contained in a sturdy black anodized steel box which sits firmly on rubber feet.

Dimensions: 2½" (64mm) x 4" (102mm) x 5⅞" (150mm)  
\$39.95 plus \$2.00 shipping and handling

## MORETON BAY SOFTWARE

A Division of Moreton Bay Laboratory



316 CASTILLO STREET  
SANTA BARBARA  
CALIFORNIA 93101  
(805) 962-3127

California Residents, Add 6% Sales Tax to Orders

## THE COCO-WRITER

MORETON BAY SOFTWARE'S NEW  
WORD PROCESSING SYSTEM  
(For the TRS-80 and TDP-100 Color Computers)

### EDITING FEATURES

Pleasant green, white and black display. Full screen editing with cursor control. All keys repeat automatically. The word wrap-around eliminates split words on the screen. Edit any ASCII file, including Basic programs. Use the calculator functions of your computer without losing your document in memory.

Insert, delete or type over characters.

Insert, split, delete or copy lines.

Insert, copy, move or delete blocks of text.

All insert, delete, move and copy commands are completed virtually instantaneously. Instantaneous response to keyboard input. Even the fastest typist is not likely to out pace the CoCo-Writer. Find any word or character string in the document. Memory count and status indicators show on the edit screen. All 128 ASCII characters can be entered from the keyboard.

### PRINTING FEATURES

Justify text at right or left margin. Justify text at both margins simultaneously for a professional looking document (such as this text). Automatically center text for titles and letter heads. Automatically number pages beginning at any number between 0 and 255. Print part or all of a document. Repeat printing of all or any portion of a document up to a 100 times. Select single sheet or continuous form printing. Embedded printer controls. Change justification, print font, and line spacing with commands in the text which do not print in the document. Print in upper/lower case or all capital letters.

### TAPE FEATURES

Document memory space with 16K: 7424 characters. Memory space with 32K: 23,808 characters. The CoCo-Writer has the same features on either a 16K or 32K system and automatically adjusts to memory upgrade. Load and save files in ASCII or binary format. Load and edit the ASCII files produced by other word processors. Save part or all of a document on tape. Merge tape file into existing document in memory.

### ADDITIONAL FEATURES OF DISK VERSION

Spool printing feature allows simultaneous editing and printing. Menu selections simply and quickly controlled with cursor. Control 1 to 4 disk drives. Load and save files on disks in any one of these drives. Split screen disk directory for all disk input and output menus. Improved directory scrolling. File names do not disappear off the top of the screen. Error trapping for all disk file names. If you enter an invalid command, the command will be terminated and the system will report the type of error.

CoCo-Writer comes with excellent documentation. The clearly written manual includes a table of contents and an index. A separate, sturdy, laminated card contains a summary of all commands for quick reference.

**CASSETTE VERSION 16K OR 32K EXTENDED BASIC**  
**\$34.95**

**DISK VERSION ON CASSETTE 16K OR 32K**  
**EXTENDED BASIC**  
**\$44.95**

(Protect your investment! Quick and automatic cassette load onto disk providing a dependable disk backup.)

```

FINISHED"
1030 PRINT:PRINT"PLAYER"Y;
1040 INPUT PL$(Y)
1045 IF LEN(PL$(Y))>7 THEN 1046
ELSE 1050
1046 Y=Y:PRINT:PRINT" RE<ENTER>
PLAYERS NAME USE (7) LETTERS O
NLY"
1047 FORT=1T0920:NEXT T:GOTO1030
1050 IF PL$(Y)=""GOTO 30ELSE 106
0
1055 Y=Y:GOTO 1010
1060 Y=Y+1
1070 GOTO 1030
1080 :
1090 :
2999 REM: INPUT HITS
3000 CLS:SOUND200,5:FOR Y=1 TO 1
5
3010 PRINT"PRESS<ENTER>WHEN FINI
SHED"
3020 PRINT"ENTER HITS FOR ";PL$(
Y):
3030 INPUT HT$(Y)
3040 IF HT$(Y)="" THEN 3100
3050 Y=Y+1
3060 GOTO 3020
3080 :
3099 REM: INPUT AT BATS
3100 CLS:SOUND 200,5:FOR Y=1 TO 1
5

```

```

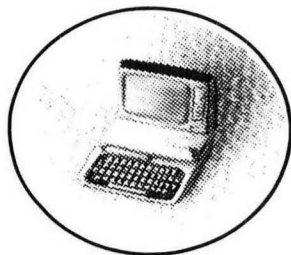
3110 PRINT"PRESS<ENTER>WHEN FINI
SHED"
3120 :PRINT"ENTER AT BATS FOR "P
L$(Y)
3130 INPUT AB$(Y)
3140 IF AB$(Y)=""THEN 3200
3150 Y=Y+1
3160 GOTO 3120
3180 :
3199 REM: INPUT RUNS
3200 CLS:SOUND 200,5: FOR Y= 1 T
O 15
3210 PRINT "PRESS<ENTER>WHEN FIN
ISHED"
3220 PRINT"ENTER RUNS FOR " PL$(
Y)
3230 INPUT R$(Y)
3240 IF R$(Y)=""THEN 3300
3250 Y=Y+1
3260 GOTO 3220
3280 :
3299 REM: INPUT STRIKE OUTS
3300 CLS:SOUND 200,5: FOR Y=1 TO
15
3310 PRINT"ENTER STRIKE OUTS FOR
"PL$(Y)
3320 INPUT K$(Y)
3330 IF K$(Y)=""THEN 3400
3340 Y=Y+1

```

**NEW!**

DEALERS PLEASE WRITE FOR DISCOUNTS

*For Color Computer  
Lovers Only*



THE COLOR COMPUTER PIN  
ONLY \$5.95 ppd.

- \* BEAUTIFUL DETAIL
- \* INDIVIDUALLY BOXED
- \* CAST IN SOLID PEWTER
- \* CLUTCH BACK
- \* IMMEDIATE DELIVERY
- \* EXCELLENT GIFT FOR  
MEN AND WOMEN



Send check or money order to

**GEMMOUNT** MANUFACTURING CO

P. O. Box 30  
(206)365-0359 Mountlake, Terrace, WA 98043

IN CANADA SEND \$6.95 TO OUR CANADIAN DISTRIBUTOR

KELLY SOFTWARE DISTRIBUTORS LTD.

CANADIAN DEALERS  
WELCOME

P.O. BOX 11932 EDMONTON, ALBERTA T5J 3L1

## NORTH WEST DATA

**15% to 20% OFF**

NOW JUST:

|                 |     |         |
|-----------------|-----|---------|
| Donkey King     | TM  | \$21.20 |
| Colorpede       | Int | \$25.45 |
| Astro Blast     | MD  | \$19.96 |
| Doodle Bug      | CW  | \$19.96 |
| Space Race      | Sp  | \$18.65 |
| Planet Invasion | Sp  | \$18.65 |
| Pacdroids       | PG  | \$15.96 |
| Starfire        | Int | \$18.65 |
| Haywire         | MD  | \$19.96 |

### PRINTERS

|                        |          |
|------------------------|----------|
| GEMINI 10              | \$339.95 |
| Serial Card for GEMINI | \$74.95  |

*Special prices in our news letter  
that only our customers  
will know about!!*

Write or call for catalog.

### NORTH WEST DATA

P. O. Box 7175 Spokane, Wa. 99207-0175  
(509) 489-5133

Add 5% for postage and handling  
Add \$3.00 for C.O.D. orders  
No C.O.D. on PRINTERS



# Complete Personal Accountant: we've made the best much more friendly.

If you have any doubts that we offer the best and most complete personal financial package available, look over the features listed below. Now we have the only package with **full screen editing** for Atari 400/800\*, TRS-80 COLOR, Commodore 64\* and VIC-20; the ability to move the cursor in any direction makes our accountant-designed package even more friendly than before. No one else offers all of these:

1. **CHECKBOOK MAINTENANCE**—automatically balances your checkbook with each entry; manages checks, charges, deposits, and interest quickly and accurately.

2. **CHART OF ACCOUNTS**—maximum of user flexibility with up to 99 accounts plus 9 sub-categories may be defined.

3. **CHECK SEARCH**—multi-reference; tracks items on every field including tax deductibles.

4. **NET WORTH/INCOME/EXPENSE STATEMENT**—know-exactly-where-you-stand program generates statements with the touch of a key.

5. **DETAIL & SUMMARY BUDGET ANALYSIS**—an absolute necessity in financial planning.

6. **CHECK WRITER**—prints personalized checks.\*\*

7. **PAYMENTS/APPOINTMENTS CALENDAR**—monthly displays of up to 250 bills and 200 appointments.

8. **COLOR GRAPH DESIGN PACKAGE**—graphs all monthly files.

9. **MAILING LIST**—maintains all records, sorts by name or zip, allows add/change/delete.

10. **FRIENDLY USER MANUAL**—complete with indexing, flow charts and diagrams; the most thorough documentation on the market.

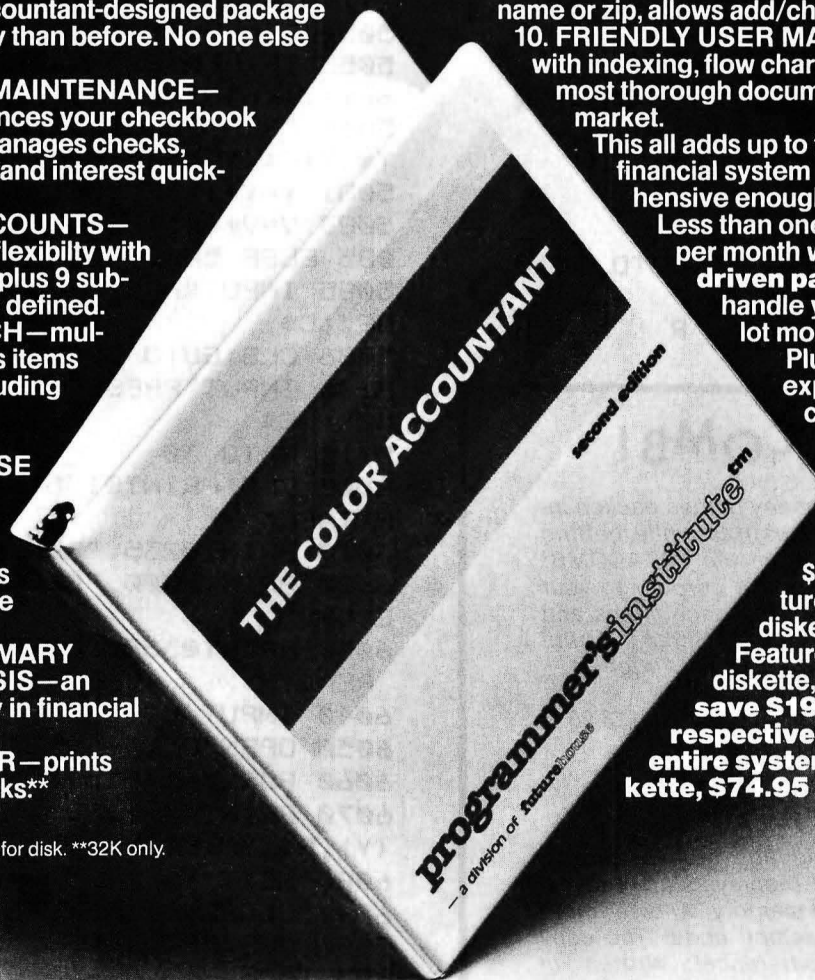
This all adds up to the finest personal financial system available—comprehensive enough for a small business.

Less than one hour of data input per month will allow this **menu-driven package** to help you handle your finances with a lot more fun than drudgery.

Plus, ours is the only expandable system; purchase the package in sections and add on as your financial needs grow.

Features 1, 2, 3 and 6: \$39.95 diskette, \$36.95 cassette; Features 4 and 5: \$29.95 diskette, \$26.95 cassette;

Features 7, 8 and 9: \$29.95 diskette, \$26.95 cassette; or **save \$19.90 or \$15.90 respectively by buying the entire system for \$79.95 diskette, \$74.95 cassette.**



\*Random Access available for disk. \*\*32K only.

Prices subject to change without notice. See your local dealer or order direct. New catalog available. Add \$3.00 for postage and handling. Credit card orders call toll free:

## 1-800-334-SOFT

DEALER INQUIRIES INVITED

# programmer's institute

a division of **FUTUREHOUSE, INC.**

p.o. box 3470, dept. R, chapel hill, north carolina 27514, 919-967-0861

```

3350 GOTO 3310
3360 :
3399 REM: INPUT WALKS
3400 CLS:SOUND 200,5: FOR Y=1 TO
15
3410 PRINT"PRESS<ENTER>WHEN FINI
SHED"
3420 PRINT"ENTER WALKS FOR "PL$(
Y)
3430 INPUT BB$(Y)
3440 IF BB$(Y)=""THEN 30
3450 Y=Y+1
3460 GOTO 3420
3570 :
3900 REM PRINT PLAYERS
4000 FOR X= 1 TO Y -1 STEP 15
4010 FOR Z=X TO X + 14
4020 PRINT Z;PL$(Z)
4030 NEXT Z
4040 NEXT X
4100 INPUT"PRESS<ENTER>TO CONTIN
UE";C$
4110 RETURN
4130 :
4990 REM: PRINT STATS
5000 CLS:FOR Y=1 TO 15:GOTO 5010
5005 Y=Y
5010 V=40:I$="AB HT R K B
B AV"

```

```

5020 PRINT@8,I$
5030 Y=Y:LET HT=VAL (HT$(Y)):LET
AB= VAL (AB$(Y))
5035 IF AB=0 THEN AB=1
5040 AV=HT/AB*1000
5045 F=FIX (AV)
5046 LN=LEN (AB$(Y)):MB=4-LN
5047 IF LEN (AB$(Y))<>4THENAB$(Y)
=AB$(Y)+STRING$(MB," ")
5048 AN=LEN (HT$(Y)):CB=5-AN
5049 IF LEN (HT$(Y))<>5THENHT$(Y)
=HT$(Y)+STRING$(CB," ")
5050 BN=LEN (R$(Y)):DB=4-BN
5051 IF LEN (R$(Y))<4THENR$(Y)=R$
(Y)+STRING$(DB," ")ELSE 5052
5052 CN=LEN (K$(Y)):EB=4-CN
5053 IF LEN (K$(Y))<4THENK$(Y)=K$
(Y)+STRING$(EB," ")
5054 EN=LEN (BB$(Y)):DB=3-EN
5055 IF LEN (BB$(Y))<3THENBB$(Y)=
BB$(Y)+STRING$(DB," ")
5065 PRINTPL$(Y):PRINT@V,AB$(Y)H
T$(Y)R$(Y)K$(Y)BB$(Y)F
5081 Y=Y+1:IF Y=16 THEN 5100
5083 V=V+64:IF Y=6OR Y=12 THEN 5
085 ELSE 5030
5085 INPUT"PRESS ENTER TO CONTIN
UE";C$
5086 CLS:GOTO 5005
5100 INPUT"PRESS<ENTER>TO CONTIN
UE"; C$
5110 GOTO 30
6000 CLS:PRINT@135,"SAVE STATS O
N TAPE"
6010 PRINT@235,"REWIND TAPE"
6020 PRINT@300,"PRESS PLAY AND R
ECORD"
6030 PRINT@388,"PRESS<ENTER>WHEN
READY"
6040 INPUT C$
6050 OPEN"O",#-1,"STATS"
6060 FOR Y=1TO15-1
6070 PRINT #-1,PL$(Y),AB$(Y),HT$(
Y),R$(Y),K$(Y),BB$(Y),F
6080 NEXT Y
6090 CLOSE#-1:RETURN
7000 CLS:PRINT@136,"LOAD STATS F
ROM TAPE"
7010 PRINT@235,"REWIND TAPE"
7020 PRINT@300,"PRESS PLAY"
7030 PRINT@388,"PRESS<ENTER>WHEN
READY"
7040 INPUT C$
7050 OPEN"I",#-1,"STATS"
7060 Y=1
7070 IF EOF (-1) THEN 7097
7080 INPUT #-1,PL$(Y), AB$(Y),HT
$(Y),R$(Y),K$(Y),BB$(Y),F
7095 Y=Y+1

```

## NEW! CATACOMB!

The best features of many games packed into one! Avoid enemy patrols while getting fuel for your escape from the CATACOMB! Then travel the hyperspace corridor to your mothership as you dodge space mines and enemy ships. Hi-Res, Multi-Screen, Multi-Color, Machine Language, Fast Action!!

16K Tape \$19.95

Disk \$23.95

Joystick Required

### PEEK COPY NEW!

Copies machine language tape programs, even most autostart! Displays start, end, execute addresses and memory! Allows you to change or insert machine code! The copy program with a difference! Written in machine language.

16K Tape \$11.95

please add \$2.00 for each order postage/handling.

(extended basic not required)

## Oregon Color Computer

PO Box 11468 Eugene Or 97440

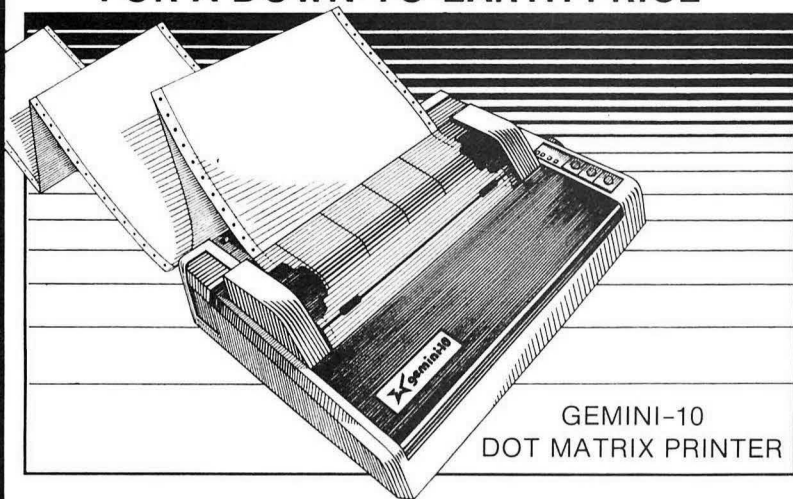




# SOFT CITY

Your largest single source of programs and products for the COLOR COMPUTER / TDP 100

## THE GEMINI-10 AN ASTRONOMICAL ARRAY OF FEATURES FOR A DOWN-TO-EARTH PRICE



GEMINI-10  
DOT MATRIX PRINTER

**MORE QUALITY:** 100 cps • thrupt time of 48 lpm • high resolution (120x144) bit image & block (6x6) graphics • extra fast forms feed

**MORE FLEXIBILITY:** super/sub script • underlining • backspacing • double strike mode • emphasized print mode • 2.3K buffer • compatible with most software supporting leading printers • 10" carriage • 15" carriage Gemini-15 available

**MORE RELIABILITY:** 180 day warranty (90 days for head & ribbon) • mtbf rate of more than 5 million lines • print head life of more than 100 million characters

### SAVE \$80.00

Our incredible Gemini-10 package - a **PRINTING SYSTEM** ready to plug in to your Color Computer **NOTHING MORE TO BUY**. Includes serial to parallel converter, graphic screen print software, deluxe user manual, and 5 minute setup instructions! A \$479.00 value. Complete package **ONLY \$399\***.

Parallel printer only, \$319.\* Order yours today!

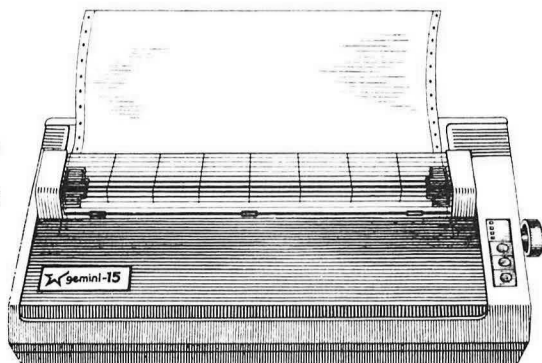


## THE POWER BEHIND THE PRINTED WORD.

### SAVE \$130.00!!!

The perfect business printer at the perfect price!

Wide 15" carriage handles any accounting report or spreadsheet assignment. Same great features as Gemini-10. Complete package as described above. A \$729.00 value for **ONLY \$599.\*** Printer only, \$519.\*



### ORDERING INFORMATION

ALL ITEMS SHIPPED FROM STOCK

Phone orders may be placed at:

(312) 260-0929  
(Our voice line),

or with your computer at:

(312) 260-0640  
(Our MODEM line)

C.O.D. orders gladly accepted, \$2.00 additional.

Mail orders and requests for catalogs should be sent to:

**SOFT CITY**  
**442 Sunnyside**  
**Wheaton, IL**  
**60187**

\*10 shipping & handling fee on all printers.

## SKYLINE 64K Memory Upgrade Kits

8 guaranteed 200 n.s. 64K memory chips, solderless installation instructions, Skyline's 64K BOOT and PAGER programs (a \$19.95 value). All for the super low price of \$59.00! Order yours today!





# TOM MIX SOFTWARE

• FOR THE COLOR COMPUTER & TDP 100 • 3424 College N.E., Grand Rapids, MI 49505. (616) 364-4791 •

**NEW**

## "THE FROG"

(C) 1983



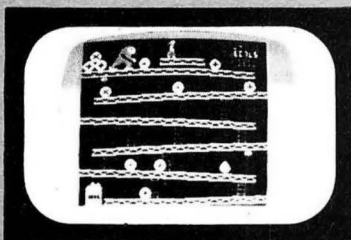
16K MACHINE LANGUAGE

\$27.95 TAPE

\$30.95 DISK

### \*\*\*ARCADE ACTION\*\*\*

This one will give you hours of exciting play... Cross the busy highway to the safety of the median and rest awhile before you set out across the swollen river teaming with hidden hazards. Outstanding sound and graphics.



## THE KING

1982

32K Machine Language

\$26.95 tape

\$29.95 disk

**ARCADE ACTION** - How high can you climb? Four full graphic screens. Exciting Sound - Realistic graphics. Never before has the color computer seen a game like this. Early reviews say: Just like the arcade - Simply outstanding!

**NEW**

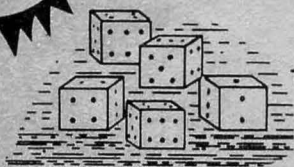
## "YAAZEE"

(C) 1983

\$19.95

16K MACHINE LANGUAGE

EXT. BASIC

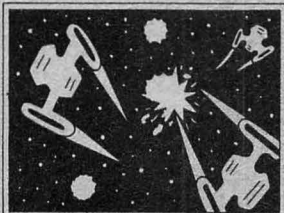


Yaazee is a 2 player game using five dice to get the best poker hand. After game is loaded flashing digit below player number determines which player rolls dice at the start of the game.

## PROTECTORS

Exciting fast paced arcade game that looks and plays like the popular arcade game "DEFENDER".

Wave after wave of enemy fighters drop bombs on your city. Destroy them before they destroy your city. Soon the mother ships appear firing laser blasts at you. Watch for the heat seeking mines.



\$24.95 TAPE \$27.95 DISK 32K MACHINE CODE

## COLOR GOLF

Now sit at your computer and play nine or eighteen holes. Outstanding graphics in the fairway or on the green. Helps your game.

32K EXTENDED BASIC

\$17.95



VISA

MasterCard

ADD \$1.00 POSTAGE & HANDLING • TOP ROYALTIES PAID  
MICHIGAN RESIDENTS ADD 4% SALES TAX • LOOKING FOR NEW SOFTWARE

**NEW**

## SPACE SHUTTLE

1983

32K Ext. Basic

\$28.95

TAPE

ONLY



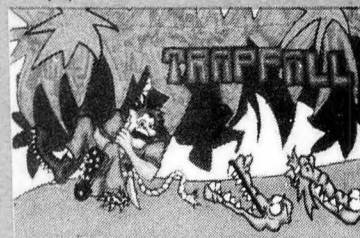
This program gives you the real feeling of flight. Full instrumentation complete to the max. Actual simulation of space flight. 32K Ext. Basic

**NEW**

## "TRAPFALL"

By KEN KALISH

(C) 1983



### \*\*\*ARCADE ACTION\*\*\*

The "Pitfalls" in this game are many. Hidden treasures, jump over the pits, swing on the vine, watch out for alligators, beware of the scorpion. Another game for the Color Computer with the same high resolution graphics as "The King."

16K MACHINE LANGUAGE

TAPE \$27.95

DISK \$30.95

## KATERPILLAR ATTACK

Outstanding graphics and sound will end all of those trips to the arcade. So much like the arcade you have to see it to believe it. Requires Ext. Basic.

16K MACHINE LANGUAGE \$21.95

DISK \$24.95

## OTHER GREAT GAMES

ALL PROGRAMS REQUIRE 16K

**BIRD ATTACK**-A fast paced machine language arcade game. Shoot the birdmen before they descend upon you. Watch out for their bombs! 16K Machine Language \$21.95

**MAZE RACE**-Maze race is a one or two player game. Play either against the built in timer or against your favorite opponent. 16K Machine Code \$17.95

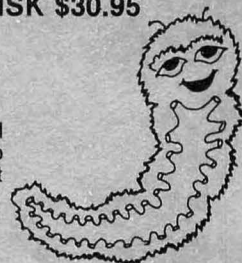
**SOLO POOL**-Now play pool with your color computer. Two players. Plays like machine language. Super color. High resolution graphics. 16K Ext. Basic \$17.95

## ADVENTURES

**TREK-16**-Travel thru space with Spock and Capt. Kirk. Adventure. Tough! Ext. Basic. \$17.95

**SHIPWRECK**-Escape from a desert isle if you can. Great Adventure! Ext. Basic. \$14.95

**ESCAPE FROM SPECTRE (Graphic Adventure)**-You are a secret agent for British Intelligence sent on a mission to obtain the secret nerve gas formula being developed by S.P.E.C.T.R.E. to destroy the world. 16K Ext. Basic \$17.95



Call our BBS Number 616-364-8217 24 Hours a Day





# TOM MIX SOFTWARE

• FOR THE COLOR COMPUTER & TDP 100 • 3424 College N.E., Grand Rapids, MI 49505 (616) 364-4791 •

## UTILITIES

**COLOR MONITOR**-Written in position independent code. (May be located in any free memory). Very compact. Only occupies 1174 bytes of memory. Full Featured. Includes Break-Pointing of machine language programs, register display and modify, memory display and modify, and block memory move commands. Displays memory in hex and ascii format on one line 8 bytes long. **MACHINE LANGUAGE \$24.95**

**ROM**-This program is a utility that will move "most" 8K Rom-Packs to disk and allow you to run them from disk. Easy to use. Requires 64K. **\$17.95**

**SCREEN PRINT ROUTINE**-Using your Epson or Microline Printer. Print the screen contents on a full size 8 1/2 x 11 sheet. 16K Ext. Basic **\$17.95**

**TAPE DUPE Now** — an all new Tape Backup Program. Even copies those hard to copy Auto-Execute Programs. Protect your software by making a backup copy. Probably the finest tape copier program ever. 16K Maching Language. **TAPE \$21.95**  
**DISK \$25.95**

**DISK TO TAPE**- Dump the contents of most disk, to tape automatically. Machine Language. **\$17.95**

**TAPE TO DISK** - Load the contents of most tapes to disk automatically. Machine Language. **\$17.95**

**MAIL LIST**-Maintain a complete mailing list with phone numbers etc. Ext. Basic. **DISK BASED \$17.95**

**THE FIXER**-Having trouble moving those 600 Hex progams to disk? The fixer will help. Completely automatic. **\$17.95**

**TAPE CAT**-All new machine language program lists contents of tapes to printer. Make a catalog of your tapes. **\$17.95**

**PROGRAM PRINTER UTILITY**-This program will list basic programs to your printer in two column format. Saves paper and makes your listing look professional. Disk based. **\$17.95**



## EDUCATIONAL SOFTWARE For The Color Computer and TDP 100

**STORY PROBLEMS** is a program that is designed to give practice in solving STORY PROBLEMS (sometimes called STATEMENT, THOUGHT or WORD PROBLEMS) on the COLOR COMPUTER. It is suitable for use in either a home or school environment. It is also a tool that will allow you to create new story problems to suit your children's needs and ability levels. It has many features that make it particularly attractive: Story problems involving addition, subtraction, multiplication, division or a combination of the four are presented to the student by slowly scrolling each letter of each problem onto the screen. Up to 5 students may use the program at the same time. There are 4, user modifiable, skill levels. 16K Ext. Basic **TAPE \$19.95**

**CLOCK**-With the ever increasing use of digital clocks, more and more young people are unpracticed in the use of the "ANALOG" clocks. You remember those, the ones with the hands. This program will attempt to teach the relationship between the two types of clocks. **REQUIRES 16K EXT. BASIC \$14.95**

**SPELLING TEST** is designed to give a standard oral spelling test using the audio track of the computer's tape recorder to dictate test words and sample sentences. Student responses are typed on the keyboard and checked by the computer. Results are displayed on the screen and (if connected) on a printer. **REQUIRES 16K EXT. BASIC \$19.95**

**MATH DRILL** is a program designed to help children to practice addition, subtraction, multiplication, and division skills on the COLOR COMPUTER. It has several features that make its use particularly attractive.

- Up to 6 students may use the program at the same time.
- Answers for addition, subtraction and multiplication are entered from right to left, just as they are written on paper.
- Commas may be included in the answers.
- Partial products for the multiplication problems may be computed on the screen.
- Division answers that have a remainder are entered as a whole number followed by the letter "R" and the remainder.
- There are ten, user modifiable, skill levels.
- A "SMILEY FACE" is used for motivation and reward. Its size increases relative to the skill level.
- Skill levels automatically adjust to the student's ability.
- A timer measures the time used to answer each problem and the total time used for a series of problems.
- After a problem has been answered incorrectly the correct answer appears under (above in division) the incorrect answer.

**REQUIRES 16K EXT BASIC \$19.95**

**WORD DRILL** is designed to give a multiple choice vocabulary quiz. Words and definitions are entered into the program from the keyboard or from a tape file. The computer displays a randomly chosen definition and eight word choices. The student must enter his response before a built in timer reaches zero. **REQUIRES 16K EXT. BASIC \$19.95**

**SEARCH-A-WORD** This Program generates a word search puzzle to your specifications. You specify the size of the puzzle and the number of words that it is to hide within the puzzle. 16K or 32K Ext. Basic. **TAPE \$17.95** **FLEX VERSION \$27.95**

**EDUCATIONAL PACKAGE — SPELLING TEST —  
WORD DRILL — MATH DRILL — ESTIMATE —  
ALL FOR — \$69.95**

**ESTIMATE** is a program designed to help children to practice estimating the answers to addition, subtraction, multiplication and division problems on the COLOR COMPUTER. It has many features that make its use particularly attractive:

- Up to 5 students may use the program at the same time.
  - There are 5, user modifiable, skill levels.
  - The acceptable percent error may be changed as a student's skill improves.
  - A timer measures the number of seconds used to answer each problem and the total time used for a series of problems.
  - If a problem has been answered incorrectly, the student is told the percent error and asked to try again.
  - If a problem is answered incorrectly a second time, the student is told the correct answer and the range of acceptable answers is displayed.
  - A report is given at the end of each set of problems that includes the number of problems done, the number of problems answered correctly on the first try and the average percent error.
  - The (BREAK) key has been disabled so that a child will not inadvertently stop the program from running.
- 16K EXT. BASIC \$19.95**

**TEACHERS' DATABASE** is a program designed to allow a teacher to keep a computerized file of information about his/her students. There are many features that make this program particularly attractive.

- Information on as many as 100 students (or more) may be in the computer at one time.
- Each student may have as many as 20 (or more) individual items of data in his/her record.
- The program will run from cassette or disk.
- Cassette and disk files are completely compatible.
- The program is menu driven.
- Records may be easily changed, deleted, combined or added.
- Information about students may be numerical or text.
- Records may be quickly alphabetized.
- Records may be sorted by various criteria.
- Records may be reordered (ranked) based on test scores or other data.
- Data displayed during a sort may be printed on a printer or saved on disk or cassette as a new file.
- A full statistical analysis of data may be done and sent to the printer.
- Student test scores may be weighted. **32K EXT BASIC TAPE \$39.95**  
**DISC \$42.95**

Call our BBS Number 616-364-8217 24 Hours a Day

• ADD \$1.00 POSTAGE & HANDLING • TOP ROYALTIES PAID •  
MICHIGAN RESIDENTS ADD 4% SALES TAX • LOOKING FOR NEW SOFTWARE

VISA



```

7096 GOTO 7070
7097 CLOSE#-1:RETURN
7200 :
7900 REM: ADD STATS
8000 CLS:SOUND1,5:FOR Y=1 TO 15
8010 CLS:IF Y=16 THEN 8100
8020 PRINT PL$(Y)"S" HITS THIS
GAME"
8030 INPUT H2:
8040 HT=VAL(HT$(Y))
8050 HT$(Y)=STR$(HT+H2)
8060 Y=Y+1: GOTO 8010
8080 :
8090 : REM: ADD AT BATS
8100 SOUND1,5:FOR Y=1 TO 15
8110 CLS: IF Y=16 THEN 8200
8120 PRINT PL$(Y)"S" AT BATS TH
IS GAME"
8130 INPUT H3:
8140 AB=VAL(AB$(Y))
8150 AB$(Y)=STR$(AB+H3)
8160 Y=Y+1: GOTO 8110
8180 :
8190 : REM: ADD RUNS
8200 SOUND1,5:FOR Y=1 TO 15
8210 CLS:IF Y=16 THEN 8300
8220 PRINT PL$(Y)"S" RUNS THIS
GAME"
8230 INPUT R2:
8240 R=VAL(R$(Y))
8250 R$(Y)=STR$(R+R2)
8260 Y=Y+1: GOTO 8210
8280 :
8290 : REM: ADD STRIKE OUTS
8300 SOUND1,5:FOR Y=1 TO 15
8310 CLS:IF Y=16 THEN 8400
8320 PRINT PL$(Y)"S" STRIKE OUT
S THIS GAME"
8330 INPUT K2:
8340 K=VAL(K$(Y))
8350 K$(Y)=STR$(K+K2)
8360 Y=Y+1: GOTO 8310
8380 :
8390 : REM: ADD WALKS
8400 SOUND1,5:FOR Y=1 TO 15
8410 CLS: IF Y=16 THEN 8500
8420 PRINT PL$(Y)"S" WALKS THIS
GAME"
8430 INPUT B2:
8440 B=VAL(BB$(Y))
8450 BB$(Y)=STR$(B2+B)
8460 Y=Y+1:GOTO 8410
8480 :
8490 : REM NEW AVERAGES
8500 FOR Y= 1 TO 15
8510 CLS: IF Y= 16 THEN30
8530 LET HT=VAL(HT$(Y)):LET AB=V
AL(AB$(Y))

```

## COLOR COMPUTER and TDP-100 OWNERS !!!

DO YOU HAVE A 32K SYSTEM WITH 64K MEMORY CHIPS?? ARE YOU STILL BEING TOLD YOU CAN ONLY USE 32K FROM BASIC??

DON'T BELIEVE IT! - KEY COLOR SOFTWARE brings you the KEY-264K. An exciting NEW SOFTWARE utility that allows any STANDARD 32K COLOR COMPUTER TO ACCESS 64K RAM FROM BASIC, and with NO HARDWARE MODIFICATIONS REQUIRED!!!

The KEY-264K divides the 64K ram memory into two 32K banks or sides, each of which can be utilized independently by the BASIC interpreter, with the ability to switch instantly from one side to the other. IT'S LIKE HAVING TWO COMPUTERS IN ONE!! Have your BASIC program on one side and keep your variables on the other side, or have your main program on one side and your subroutines on the other side, or have your program on one side and use the other side for 4 additional HI-RES pages, or any combination you like. The possibilities are endless because the KEY-264K allows full communication between sides plus the ability to switch back and forth at will, all from within BASIC. You could also have different programs in each side and switch back and forth between them using simple keystrokes, even while the programs are running!! Or run them both at the same time in the FOREGROUND/BACKGROUND MULTI-TASKING mode. Don't buy that printer buffer yet! With the KEY-264K you can be printing in the background side while utilizing your computer normally in the foreground side AT THE SAME TIME!!! Debugging a program? Use either a BASIC command or simple keystrokes to instantly duplicate your program, in it's present status, onto the opposite side. Switch to the opposite side later and pick up exactly where you were before!

For DISK users, the KEY-264K allows you to alternate between DISK and EXTENDED BASIC on the same side with simple keystrokes. No need to pull your disk controller or power down. You can be in EXTENDED BASIC on one side and in DISK BASIC on the other side and still switch back and forth and have full communications between the two sides.

The KEY-264K does all this and MORE thru extensions to the BASIC interpreter, No need to learn a new language!!! In total the KEY-264K adds 15 NEW COMMANDS and 1 function to BASIC, including powerful new BLOCK MEMORY MOVE and GRAPHICS VIEWING commands.

NOTHING ELSE LIKE IT - YOU HAVE TO SEE IT TO BELIEVE IT !!!!!

The KEY-264K works on 32K systems with "E", "F", or even modified "D" boards and requires EXTENDED or DISK BASIC with GOOD 64K MEMORY CHIPS! Systems with piggy-back 32K or half-good 64K memory chips WILL NOT WORK!!!

ORDER YOUR KEY-264K CASSETTE TODAY by sending check or money order for \$39.95 plus \$2.00 shipping and handling (Mass. residents add 5% sales tax) to:

KEY COLOR SOFTWARE  
P.O. BOX 360  
HARVARD MA. 01451



```

8535 IF AB=0 THEN AB=1
8540 AV=HT/AB*1000
8550 GOTO 30
8900 CLEAR 500
9000 CLS
9006 PRINTTAB(9)"PITCHING STATS"
9007 PRINT STRING$(32,"*")
9010 PRINTTAB(7) "WHICH DO YOU WANT"
9015 PRINT STRING$(32,"-")
9020 PRINTTAB(8) "(1) LIST PITCHERS"
9030 PRINTTAB(8) "(2) ADD TO LIST"
9040 PRINTTAB(8) "(3) INPUT STATS"
9050 PRINTTAB(8) "(4) PRINT STATS"
9060 PRINTTAB(8) "(5) ADD TO STATS"
9070 PRINTTAB(8) "(6) SAVE TO TAPE"
9080 PRINTTAB(8) "(7) LOAD FROM TAPE"
9085 PRINTTAB(8) "(8) RETURN TO MENU"
9090 PRINTTAB(13) "(1-7) ?"
9100 INPUT W

```

```

9110 ON W GOSUB 9190,9200,9310,9820,10000,10500,10600,30
9120 IF W$="" THEN 9110
9130 :
9160 REM: INPUT PITCHERS
9180 :
9190 CLS:FORY=1 TO 7
9200 Y=Y:CLS
9210 PRINTTAB(11)"INPUT PITCHERS"
9220 PRINT"PRESS<ENTER>WHEN FINISHED"
9230 PRINT"PITCHER" Y;
9240 INPUT PT$(Y)
9250 IF PT$(Y)="" THEN 9000
9260 Y=Y+1
9270 GOTO 9230
9290 :
9300 REM: INPUT STATS
9310 CLS:FORY=1 TO 7
9320 PRINT"PRESS<ENTER>WHEN FINISHED"
9330 PRINT:PRINT"HITS GIVEN UP BY" PT$(Y)
9340 INPUT HG$(Y)
9350 IF HG$(Y)="" THEN 9410
9360 Y=Y+1
9370 GOTO 9330

```



**DATABASE / MAILER - 'CC-DBM' ..... \$49.95**  
**LETTER WRITER - 'CC - LW' ..... \$39.95**  
*introductory offer - FREE!* **CC-LW** with the purchase of **CC-DBM**

**Database/Mailer "CC - DBM" 16K or 32K**

- Simple to use even for the novice
- Active Main Menu guides user to valid operations.
- 32K disk (or tape) allows 59, (61) to 338, (351) records.
- 16K disk (or tape) allows 12, (15) to 72, (86) records.
- 4 to 10 fields, 5 to 27 widths, 20 to 270 char./record.
- All user definable with default values for ease of use.
- Automatic memory sense adjusts to the size of your system.
- Fast Basic sort by any field with "Percent Sorted" display.
- Automatically adjusts for empty address lines - no gaps.
- Print up to 9 line labels on envelopes or mailing labels.
- Optional special printer codes for customized labels.
- Master printout with 2 column format including field name.
- Automatically prints header with date, paging and filename.
- Works with any printer, use friction or tractor feed.
- Selective printing by any field or field range.
- Optional multiple copies of mailing labels.
- Single screen 10 record display by user defined field.
- Single key entry provides hard copy of screen data.
- Comprehensive 25 page users manual with flow diagrams.
- Includes detailed instructions for user modification.
- ★ Compatible with CC-LW for mail-merge, form letters, etc.

**Letter Writer "CC - LW" 16K or 32K**

- Much easier to use than a 'word processor.
- Allows fast single page letter writing.
- Embedded commands for centering, multiple line skip, tabbing and optional indent new paragraph.
- 16K or 32K tape or disk.
- Edit mode allows you to delete or insert text.
- ★ Uses CC-DBM data files for form letter capability.
- Works with any printer and standard paper.
- Excellent users manual.

CC - DBM 16K, 32K disk or tape \$49.95   
 CC - LW 16K, 32K disk or tape \$39.95 

PLEASE SPECIFY TAPE OR DISK -

To order, send check or money order to:  
**EVS Engineering**  
**9528 Suite 35, Miramar Road**  
**San Diego, CA 92126**

Or check your local software dealer. For questions, credit card orders, call (619) 695-1385 or (619) 566-6013 on weekdays 8 A.M. to 4 P.M. PST. We will be glad to help. Dealer inquiries invited.  
 California residents please add sales tax - 6%.  
 Allow 2 weeks for personal checks.



```

9390 :
9400 : REM: INNINGS PITCHED
9410 CLS:FORY=1TO7
9420 PRINT"PRESS<ENTER>WHEN FINI
SHED"
9430 PRINT"INNINGS PITCHED FOR "
;PT$(Y)
9440 INPUT IP$(Y)
9450 IF IP$(Y)=""THEN 9520
9460 Y=Y+1
9470 GOTO 9430
9500 :
9510 REM: STRIKE OUTS
9520 CLS:FORY=1TO7
9530 PRINT"PRESS<ENTER>WHEN FINI
SHED"
9540 PRINT"STRIKE OUTS FOR "PT$(
Y)
9550 INPUT SO$(Y)
9560 IF SO$(Y)=""THEN 9620
9570 Y=Y+1
9580 GOTO 9540
9600 :
9610 REM: WALKS
9620 CLS:FORY=1TO7
9630 PRINT"PRESS<ENTER>WHEN FINI
SHED"
9640 PRINT"WALKS GIVEN UP BY "PT
$(Y)

```

```

9650 INPUT W$(Y)
9660 IF W$(Y)=""THEN 9720
9670 Y=Y+1
9680 GOTO 9640
9700 :
9710 REM: EARNED RUNS
9720 CLS:FORY=1TO7
9730 PRINT"PRESS<ENTER>WHEN FINI
SHED"
9740 PRINT"EARNED RUNS ALLOWED B
Y "PT$(Y)
9750 INPUT ER$(Y)
9760 IF ER$(Y)="" THEN 9000
9770 Y=Y+1
9780 GOTO 9740
9800 :
9810 : REM: PRINT STATS
9820 CLS: FOR Y=1 TO 7
9830 PRINT@10,"HT":PRINT@13,"IP"
9840 PRINT@17,"K":PRINT@20,"BB"
9850 PRINT@24,"R":PRINT@27,"ERA"
9860 LET ER=VAL(ER$(Y))
9870 LETIP=VAL(IP$(Y))
9880 IFER=0THENEV=0
9881 IF ER=0THEN 9897
9890 EV=ER/IP*7
9891 IF LEN(HG$(Y))<3THENHG$(Y)=
HG$(Y)+" ":GOTO9891
9892 IFLEN(IP$(Y))<4THENIP$(Y)=I
P$(Y)+" ":GOTO 9892
9893 IFLEN(SO$(Y))<3THENS0$(Y)=S
O$(Y)+" ":GOTO 9893
9894 IFLEN(W$(Y))<4THENW$(Y)=W$(
Y)+" ":GOTO9894
9895 IFLEN(ER$(Y))<3THENER$(Y)=E
R$(Y)+" ":GOTO 9895
9896 IF LEN(PT$(Y))<8THENPT$(Y)=
PT$(Y)+" ":GOTO 9896
9897 EV$=STR$(EV)
9898 IF LEN(EV$(Y))<5THENEV$(Y)=
EV$(Y)+" ":GOTO9898
9900 PRINT PT$(Y)TAB(10)HG$(Y) I
P$(Y) SO$(Y) W$(Y) ER$(Y) EV
9910 Y=Y+1
9920 IF Y=8 THEN 9930 ELSE 9860
9930 PRINT"PRESS<ENTER>TO CONTIN
UE":INPUT C$
9940 GOTO 9000
9960 :
9970 : REM: ADD STATS
10000 CLS: FOR Y=1 TO 7
10010 CLS:IF Y=8 THEN 10070
10020 PRINTTAB(7)"ADD TO PITCHIN
G STATS"
10030 PRINT:PRINT PT$(Y)"S"
10035 PRINT:PRINT"INNINGS PITCHE
D THIS GAME"
10040 INPUT I2:IP=VAL(IP$(Y))
10050 IP$(Y)=STR$(IP+I2)
10060 Y=Y+1:GOTO 10010

```

## COLOR-FORTH

Including SEMIGRAPHIC-8 EDITOR  
+ UTILITIES

- Disk and Tape utilities
- Boot from disk or tape
- Graphics and Sound commands
- Printer commands
- Auto-repeat and Control keys
- Fast task multiplexing
- Unique TRACE function in kernal
- Clean INTERRUPT handling  
in HIGH-LEVEL FORTH
- CPU CARRY FLAG accessible
- Game of LIFE demo
- ULTRA FAST:written in assembler
- Directions included for  
installing optional ROM in  
disk controller or cartridge
- Free Basic game "RATMAZE"

\$58.95

# FORTH

HOYT STEARNS ELECTRONICS  
4131 E. CANNON DR. PHOENIX, ARIZONA 85028  
602-996-1717



# SELECTED SOFTWARE

## FOR THE COLOR COMPUTER

All programs are in 16K machine language unless noted.

### MARK DATA PRODUCTS

- \*\* **SPACE RAIDERS** New Invader-type game. Super Hi-Res Graphics and Sound. You'll love it. **\$24.95**
- \* **ASTRO BLAST** Excellent space shooting game. Super Hi-Res Graphics and Sound. **\$24.95**
- \* **COLOR HAYWIRE** Classic arcade game, rated A+ by Color Computer magazines. **\$19.95**

### SPECTRAL ASSOCIATES

- \* **ANDROID ATTACK** Excellent berserk-type game. Comes with 16K and 32K. 32K version will talk. **\$21.95**
- \* **MS. GOBBLER** (32K) Outstanding Pac Man-type game with 4 different mazes and 16 skill levels. **\$21.95**
- \* **WHIRLYBIRD RUN** Pilot a chopper over a varying terrain while dropping bombs and firing missiles to destroy enemy bases, ships and missiles. **\$21.95**
- \* **GALAX ATTAX** Protect your base by shooting alien fighter in formation. Excellent Graphics and Sound. **\$21.95**
- \*\* **SPACE RACE** Maneuver yourself in space but alien ships appear and must be destroyed. Hi-Res Graphics and Sound. **\$21.95**
- \* **PLANET INVASION** Excellent Defender-type game. Highest-Res Graphics and Sound. **\$21.95**
- \* **DEFENSE** Defend your spaceships from enemy laser beams. **\$21.95**
- \* **SPACE WAR** You must break through the enemy fighters and the defenses of Death Star. Super fast. **\$21.95**
- \*\* **SPACE INVADERS** Fast action Invader game. Excellent Graphics and Sound. **\$17.95**
- \* **GHOST GOBBLER** Highly rated Pac Man-type game. 16 skill levels and lots of action. **\$19.95**
- \* **KEYS OF THE WIZARD** Super adventure game! Great sound! You never play the same twice. **\$19.95**

### TOM MIX SOFTWARE

- \* **DONKEY KING** (32K) Just Outstanding! **\$24.95**
- \* **KATERPILLAR** Excellent Centipede-type game. Highly rated by Color Computer magazines! **\$24.95**
- \* **WAR KINGS** Battle to save your castle and king. Hi-Res Graphics with Outstanding Sound. **\$19.95**
- \* **PROTECTORS** (32K) Excellent Graphics and Sound. **\$24.95**

### MED SYSTEMS

- INVADER'S REVENGE** You are the last survived space invader. You must revenge! **\$19.95**
- PHANTOM SLAYER** Enter the deadly catacombs and destroy the phantoms, 3-D Graphics. **\$19.95**

### INTELLECTRONICS

- \* **DUNKEY MUNKEY** (32K) Absolutely excellent Donkey Kong-type game. You'll love it! **\$21.95**
- STAR FIRE** One of the best Defender-type game. Hi-Res Graphics and Sound. **\$19.95**

### INTRACOLOR

- \*\* **COLORPEDE** Just like the arcade. **\$29.95**
- \* **ROBOTTACK** Just like the arcade. **\$24.95**

### THE PROGRAMMER'S GUILD

- \*\* **PACDROIDS** The most challenging Pac Man-type. Super Hi-Res Graphics and Sound. **\$19.95**

### CHROMATIC SOFTWARE

- \* **THE SPIDER** Travel the channels destroying the spiders before they get you. Super action. Excellent Graphics and Sound. **\$19.95**

### DATA SOFT

#### Top Notch Games

- \* **ZAXXON** (32K) Maneuver your ship through a battlefield of state-of-the-art missiles, anti-aircraft tanks and enemy planes. Survive all that and you'll meet the deadly ZAXXON Robot! **\$39.95**
- \*\* **MOON SHUTTLE** Pilot your moon shuttle through outerspace avoiding man-o-wars, meteors, bomb launchers and expandos to meet the prince of darkness. But watch out for his darkest side. **\$34.95**

#### COMPUTERWARE

- \* **DOODLE BUG** Just like ladybug in the arcade. **\$21.95**

#### THE CORNSOFT GROUP

- \*\* **FROGGER** Just like the arcade. **\$19.95**

#### ELITE SOFTWARE

- \* **ZAKSUND** (32K) Fly your spaceship through enemy star bases. Avoid guided missiles, lasers and firing turrets. Can you reach their leader? **\$24.95**

#### SOFT SECTOR MARKETING

- MASTER CONTROL II** Comes with plastic keyboard overlay and complete easy to understand manual. **\$19.95**

- COLOR GRAPHIC EDITOR** This program permits the creation of graphic pictures on the screen that can be saved to disk for later use. Requires extended BASIC or DISK BASIC. **\$19.95**

- COLOR BONANZA** 50 programs on 6 cassettes stored in an attractive package. Some require extended BASIC. **\$39.95**

#### SUGAR SOFTWARE

##### Extended BASIC Programs

- TIMS** Excellent personal database management system. **\$24.95**
- GALACTIC-HANGMAN** Top-rated Hangman game. Can you find a better one? **\$14.95**

#### NELSON SOFTWARE SYSTEMS

- SUPER COLOR WRITER II** Version 3.0.
  - 64K Compatible Tape . . . . . **\$69.95**
  - Rompak . . . . . **\$89.95**
- SUPER COLOR TERMINAL** Version 3.0.
  - 64K Compatible Tape . . . . . **\$49.95**
  - Rompak . . . . . **\$59.95**

#### UPGRADE YOUR COLOR COMPUTER!

Complete solderless kits with easy-to-follow instructions.

|                |                |
|----------------|----------------|
| <b>4K-16K</b>  | <b>\$15.95</b> |
| <b>4K-32K</b>  | <b>\$49.95</b> |
| <b>16K-32K</b> | <b>\$34.95</b> |

#### 64K CHIP SET

- Eight 4164-200 NS Prime ICs **\$54.95**

Note: All ICs used in our kits are first quality 200NS Prime Chips and carry one full year warranty.

\* Requires Joystick    \*\* Joystick Optional

**ORDER 2 ITEMS AND GET 10% OFF!**

We pay postage on all orders in the United States and Canada. Overseas please add \$3.00

We accept check or money order.

U.S. funds only for foreign orders.

Send to:

**SELECTED SOFTWARE**  
**P.O. Box 32228, Fridley, MN 55421**  
 (MN Residents add 6% sales tax.)





# YORK 10™

# BASF-DPS

WORLD STANDARD TAPE

**MONEY BACK  
GUARANTEE**

## COMPUTER GRADE BLANK CASSETTES

PREMIUM 5-SCREW SHELL WITH LEADER FITS ALL STANDARD RECORDERS  
PREFERRED BY SOFTWARE PRODUCERS, SCHOOLS AND BUSINESSES NATIONWIDE



DATA TRAC / C-05, C-10, C-20

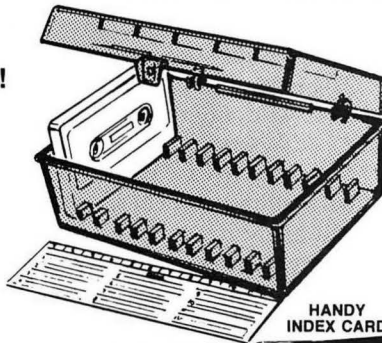
### CASSETTE STORAGE CADDY

**NEW!**

ORGANIZE  
YOUR TAPES!  
**\$2.95 EACH**



STACKABLE



HANDY  
INDEX CARD

**INTRODUCTORY OFFER!**  
ORDER 2 DOZ. CASSETTES AND 1 CADDY  
GET 1 CADDY FREE!  
OR ORDER 4 DOZ. CASSETTES AND  
2 CADDIES — GET 2 FREE

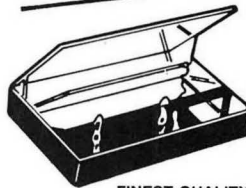
OFFER EXPIRES AUGUST 1, 1983

### HERE'S WHAT USERS SAY ABOUT YORK 10 CASSETTES:

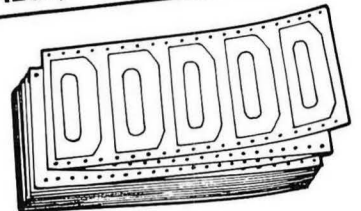
"It's nice to have a tape you can rely on 100% of the time to perform with such quality. And the fast, courteous service was a pleasant surprise."  
Tom Parkinson—Madison, OH

"We monitored the output to the computer with a specially built meter and found absolutely no dropouts throughout the tape..."  
Stace Papadopoulos—Beaverton, OR

**"YOU'VE TRIED THE REST, NOW BUY THE BEST"**



FINEST QUALITY  
PHILIPS (NOELCO)  
TYPE HARD BOXES



TRACTOR FEED  
DIE-CUT BLANK  
CASSETTE LABELS



**Call: 213/710-1430**  
FOR IMMEDIATE SHIPMENT  
on Credit Card Orders.



**ORDER NOW YORK 10™ Computerware**  
Mail To ...

24573 Kittridge St., #R Canoga Park, CA 91307

| ITEM                                                                                       | 1 DOZEN                           | 2 DOZEN                             | TOTAL |
|--------------------------------------------------------------------------------------------|-----------------------------------|-------------------------------------|-------|
| C-05                                                                                       | <input type="checkbox"/> 7.50     | <input type="checkbox"/> 13.50      |       |
| C-10                                                                                       | <input type="checkbox"/> 8.00     | <input type="checkbox"/> 14.40      |       |
| C-20                                                                                       | <input type="checkbox"/> 10.00    | <input type="checkbox"/> 18.00      |       |
| Hard Box                                                                                   | <input type="checkbox"/> 2.50     | <input type="checkbox"/> 4.00       |       |
| Storage Caddy @ \$2.95 ea.:                                                                | Quantity: _____                   |                                     |       |
|                                                                                            | FREE: Quantity: _____             |                                     |       |
| Blank labels                                                                               | <input type="checkbox"/> 4.00/100 | <input type="checkbox"/> 30.00/1000 |       |
|                                                                                            | <b>SUB TOTAL</b>                  |                                     |       |
| Calif. residents add 6% sales tax                                                          |                                   |                                     |       |
| Shipping/handling 1 doz. \$2; 2 doz. \$3.50;<br>3 doz. \$4.50; each additional doz. \$.50. |                                   |                                     |       |
| For Parcel Post instead of UPS \$1 additional                                              |                                   |                                     |       |
| Outside Continental USA, \$2 additional                                                    |                                   |                                     |       |
|                                                                                            | <b>TOTAL</b>                      |                                     |       |

Each cassette includes two YORK 10 labels only. Boxes are sold separately. Shipments are by U.P.S. unless Parcel Post requested. Boxes, caddies, and blank labels are free of shipping charges when ordered with cassettes. When ordered without cassettes, shipping charges: Boxes—\$1.00/doz., Caddies \$1.00 each. MINIMUM SHIPPING/HANDLING ON ANY ORDER—\$2.00.

Check or M.O. enclosed  Charge to Credit Card:  VISA  MASTERCARD

Card No. \_\_\_\_\_ Exp. \_\_\_\_\_

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State/Zip \_\_\_\_\_

Signature \_\_\_\_\_

Computer make & model \_\_\_\_\_ Disk?(y/n) \_\_\_\_\_

CHECK HERE FOR QUANTITY DISCOUNTS PRICE LIST

## BUILD THIS BOARD FOR EASY INTERFACING

By Dennis Meixsell

I'm sure most Color Computer owners would love to be able to hook up devices such as a real time clock, voice synthesizer, complex sound generators, keypads, etc. Even though these modifications are not that complicated or expensive, it seems the thought of getting a soldering gun within 10 feet of our precious CoCo is enough to leave most of us lying awake staring at the ceiling. Also, such words and phrases as address lines, data bus, interrupt, read/write and clock begin to totally overwhelm us.

Well, I have some good news. In this article you will learn the basic steps of interfacing without taking the back off your CoCo. All the connecting will be done through the cartridge port using inexpensive and readily available parts (most coming from "Mama" Radio Shack herself). For the experienced hobbyist this may be all you need to get over the hump and into some serious projects. For the newcomer there is plenty to learn about interfacing, but this first step will give you what you need to begin experimenting.

The standard device used for interfacing is the Motorola 6921, called the Peripheral Interface Adapter. The PIA, as we will refer to it, decodes specific addresses, incorporates timing and provides memory port addressing. It provides two eight bit ports with each bit selectable as an output or input port. This will be explained in more detail later in this article.

Our project is to build an experimenter's board and hook up a PIA. This board will be versatile and the foundation of future experiments. Once this project is finished, most additional interfacing will be a snap. So hang in there and the rewards will be great. The construction will involve three steps; making a ribbon connector, building the experimenter's board and interfacing the PIA.

Parts to be used are as follows:

\*276-165 computer PC board

\*276-174 modular I.C. breadboard (solderless)

\*64-2346 self-sticking cushion feet

\*276-1558 edge connector—40 pin solderless

\*64-2343 double-sided foam tape

\*22 or 24 gauge solid connection wire

\*Motorola 6821 PIA (not available at Radio Shack)

\*wire ribbon, 2 feet (discontinued at Radio Shack but still might have it)

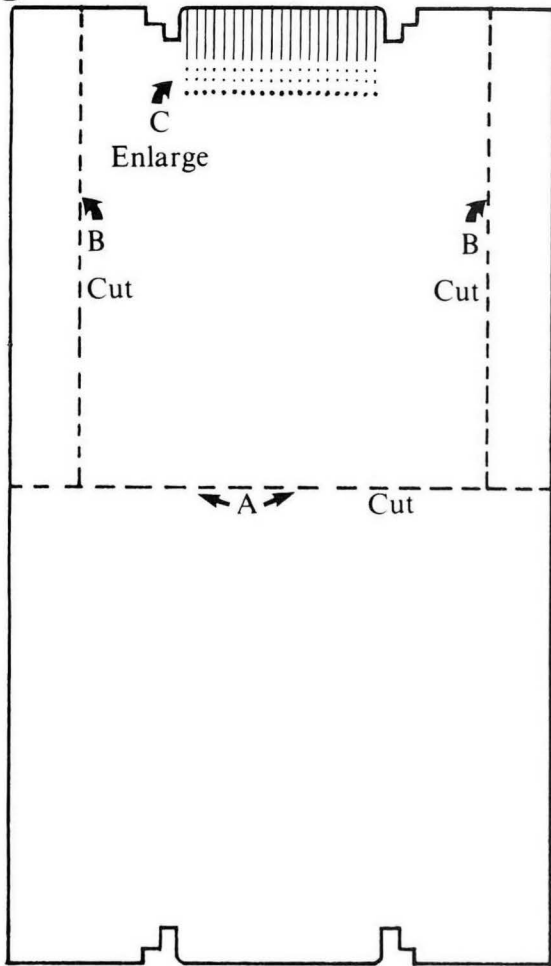
If you are a wise shopper, these items can be purchased at a lower price elsewhere. If you don't want the grief and have a few extra bucks, you can purchase experimenter boards and pre-made extension cables from several companies found in this magazine.

The first step is for convenience and to protect the edge connector inside the CoCo. What we will make is simply a connector extender; that is, a 40-pin extension cord. You may want to leave this in the CoCo permanently and plug all cartridges into the ribbon connector. Take the 276-165 computer connecting board and cut it in half along the dotted line marked A (Figure 1). Put the bottom half aside, it will be used later. Then cut along the two dotted lines marked B. With the CoCo off, plug this board into the cartridge port to see if you did a good job cutting. Be sure to keep it level with the CoCo. If it is raised too high or low it may damage the CoCo's internal connector. Be sure to keep the printed side up and the copper side down in all steps. Remove the board from the CoCo. The next step is to solder the 40-wire ribbon to this board.

From one end of a two-foot section of 40-wire ribbon cable, separate each wire back about 3" with a knife. Then strip ¼" of insulation from the end of each of the 40 wires. This is a tedious and difficult job. I usually roll a knife over each wire on a hard surface. Be very careful. This may take some practice. Next, slightly enlarge the holes marked C



# Figure 1



|    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |   |   |   |   |
|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|---|---|---|---|
| 39 | 37 | 35 | 33 | 31 | 29 | 27 | 25 | 23 | 21 | 19 | 17 | 15 | 13 | 11 | 9  | 7 | 5 | 3 | 1 |
| 40 | 38 | 36 | 34 | 32 | 30 | 28 | 26 | 24 | 22 | 20 | 18 | 16 | 14 | 12 | 10 | 8 | 6 | 4 | 2 |

Color Computer  
internal connector

(Figure 1). There are 20 of these and they need to be large enough to allow a strand of the 40-wire cable to pass through, insulation and all. Now thread every other wire from the ribbon cable through the holes marked C. Start on the right and put wire #1 through that hole. Be sure that pin #1 on this edge connector will line up with pin #1 on the solderless connector that will be placed on the other end of the cable. If in doubt, use a volt-ohm meter and check it out. Now you must solder each of the wires to the base of the corresponding prong on the 40-pin edge connector. After this is accomplished tape the ribbon to the PC board to act as a strain release. On the bottom of the PC board tape a 1/4" thick piece of plastic or wood to insure that the edge connector stays parallel with the CoCo's connector. Put the solderless 40-pin connector on the free end of the cable. A small hammer will help to lightly tap the back piece in place. Now mark in large, clear letters "TOP" and "BOTTOM" on both the edge card and the 40-pin connector (this will save much frustration later). Put this aside—the hard part is over.

The second phase will use the bottom half of the PC board, the 40-pin socket and connecting wire. Place the 40-pin socket on the printed side of the PC board in the location shown on Figure 2. Look at the copper side of the board and make sure each leg is going through an individual copper pad. Solder the socket into place. Now solder a wire from each pin of the edge card to the appropriate pin of the

## UTILITIES FOR EXTENDED BASIC

### #UK2 COLOR KRUNCHER — \$12.95

- Reduces Memory Requirements of Any Ext. BASIC Program—Speeds Program Execution Time
- Type In A Program From A Magazine, As Is, Debug It, Then Let KRUNCHER Make It Shorter
- Includes LN.XREF and REM.REMV (#UR2)
- Includes "EXTENDED BASIC FASTER" (#F1)

### #F1 "EXTENDED BASIC FASTER" — \$3.95

- The First Published Proven List of Methods YOU Can Incorporate Into All Your Own Ext. BASIC Programs For Maximum Speed Efficiency
- For Novice or Experienced Programmer
- For Graphics or Non-Graphics Programs

### #UV4 VARIABLE CROSS REFERENCE — \$6.95

- Locates All Variables And "Where Used" Line #'s In Your Ext. BASIC Program
- Optional Variable Only List (No Line #'s)
- Automatic Sort—Optional Printer Output

### #UF2 LLIST FORMATTER — \$9.95

- User-selectable Margins, Page Lengths, Top-of-Form, Font Size, Line Length And More
- Title And Date Your Important Listings
- Start And Stop Listings At Any Line #
- Optional Space Between Lines—Highlights Line Numbers—Opt. Single-Sheet Pause—For Most Recent Printers (can be user modified)

### #UR2 LINE CROSS REFERENCE — \$7.95

- Provides A Sorted Listing Of All Referenced Line Numbers—Optional Printer Output
- Includes Optional REM.REMV—Removes All Unreferenced REM's And Comments And Line #'s
- Removes Comments From Referenced REM's

### #UD2 DISK DIRECTORY WITH BYTES — \$7.95

- Gives Same Info As DIR, PLUS Individual File Bytes, PLUS Free And Used Total Files, Grans, And Bytes, PLUS Optional Disk Name, PLUS To Screen Or Printer
- One Screen At A Time (No More Frantic SFT/@)
- Includes Separate DISK NAME Program

### #US3 COPY/SEARCH/REPLACE/DELETE — \$7.95

- Same As Disk COPY, But To-and-From Disk and Tape Or Tape and Tape
- For ASCII Textfiles Or Programs
- Search OR Search & Replace (optional) OR Search & Delete (optional)
- Excellent For Changing Long Variable Names
- Great For Changing Spelling Or Capitalization

### #UT2 TEXT COUNT — \$6.95

- Counts Lines, Sentences, Words, Total Characters Of An ASCII Ext. BASIC Textfile

### #UB2 BYTE/LINE COUNT — \$5.95

- Automatic, Accurate Byte & Line Count Of Any Ext. BASIC Program

ALL PGMS (EXCEPT #UD2) FOR EXT. BASIC TAPE/DISK  
**BUY 3 OR MORE ON THE SAME ORDER & TAKE 10% OFF**

(Post Paid in U.S. & Canada) (PA Residents Add 6%)

Send Check Or Money Order To:

## MICROLOGIC

Box 193, First Avenue  
East Brady, PA 16028  
(412) 526-5781

## COLOR COMPUTER SOFTWARE

### ★ UNIVERSAL PROGRAM 1(UP-1) ★

Known as the Program Stacker, UP-1 allows several programs to be loaded until the memory is filled. Quickly jump from one program to another or compose new programs while retaining the old ones. Programs are included for patching damaged programs. Allows data or machine language programs to be stored and retrieved from a cassette. Programs are included for writing values or characters to memory, and displaying memory contents. Blocks of memory can be relocated. UP-1 can be used as a Word Processor by allowing text to be stored in memory and printed on the screen or an external printer. UP-1 Cassette \$14.95.

### ★ DISASSEMBLER-ASSEMBLER (DISASM) ★

Using English mnemonics and Decimal Locations, DISASM is an easy way to learn to assemble machine Language Programs or Subroutines. Subroutines can be used with Basic Programs and called by either USR or EXEC commands. For CC compatibility, all locations are given in Decimal Values eliminating the confusion associated with using HEX. All commands are Menu oriented and the user provides the particulars for the commands without having to remember command formats. The Disassembler can be used to Analyze Machine Language Programs as well as the Basic and Extended CC ROMS. Example programs are included. Cassette \$19.95.

### ★ TERMINAL PROGRAM (DYTERM) ★ new

DYTERM is designed to convert a Color Computer into a terminal. Use it to send and receive information from another computer, another terminal, or use it to provide the software needed for sending and receiving information over telephone lines with a MODEM. DYTERM is a BASIC program with Machine Language Subroutines. Cassette \$14.95.

**EXTENDED BASIC is not REQUIRED. All programs require a 16K Computer and are DISC compatible.**

## HARDWARE ITEMS

Increase your computer's memory with the following Memory Expansion Kits. Soldering is not required but your warranty will be voided by removing the cover. The kits carry a one year warranty.

|                             |         |
|-----------------------------|---------|
| ME-1 upgrades 4K to 16K     | \$19.95 |
| ME-2 upgrades 4K to 32K     | \$59.95 |
| ME-3 upgrades 16K to 32K    | \$39.95 |
| ME-4 upgrades all CC to 64K | \$99.95 |

Note: A 1.1 ROM is required for ME-4

|                                   |         |
|-----------------------------------|---------|
| 6809E Microprocessor Chip         | \$19.95 |
| 6821 Peripheral Interface Adapter | \$6.95  |

## WE REPAIR COMPUTERS

### ★ PUT YOUR PROGRAMS IN A PROM PACK ★

We will put your Machine Language and/or BASIC Programs in a Cartridge. Send us your program on a Cassette and we will return a Cartridge with your program in it. The cost is \$19.95 for up to 4K and \$29.95 for up to 8K. Add \$2 for shipping.

ATTENTION SOFTWARE PROGRAMMERS: We are looking for good original programs and are willing to pay high ROYALTIES for them. Write or call for details.

### DEALERS INQUIRIES INVITED

Checks, VISA & MC Cards Add \$1 shipping

## DYNAMIC ELECTRONICS INC.

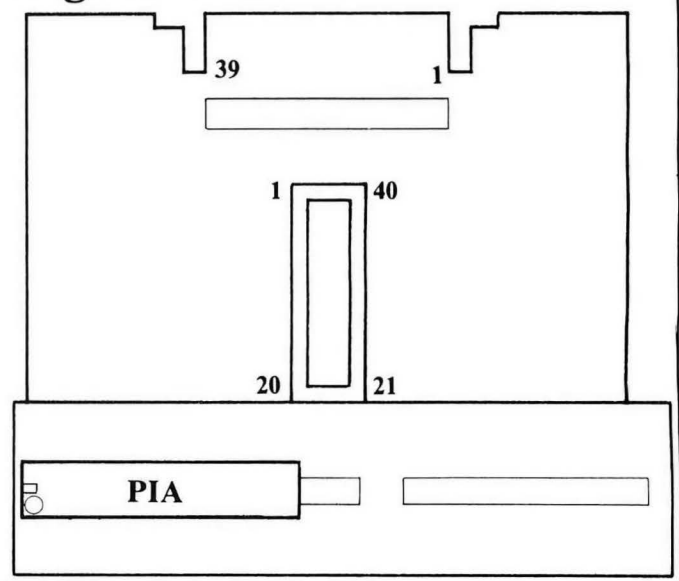
P.O. Box 896 (205) 773-2758  
Hartselle, AL 35640

40-pin socket. Pin 1, 3, 5, 7, 9, . . . are on top of the PC board. Pins 2, 4, 6, 8, . . . are on the bottom. The dip socket is numbered 1-20 on the left side and 21-40 on the right side. You should mark the dip socket and edge connector with the appropriate numbers to help as you solder. I tried to make this look nice by running all the wires on the bottom side and then coming up in front of the top pins. Be sure that this is exact. Use a VOM and be positive that each wire goes from the edge card pin number to the same number on the dip socket. Now with double-sided tape secure the solderless breadboard to the lower section of the PC board. Put four cushion footies on the bottom side and BINGO! You are now the proud owner of an experimenter's board!

Finally, in part three, I will show how to connect the PIA to the experimenter's board. Get the package that contains the PIA. Use proper handling technique, or static electricity could damage the PIA. Without interruption, pick up the PIA in both hands. Use one hand to straighten any bent pins. Now place the chip on the left end of the solderless breadboard. Make sure that pin #1, which is identified by the circle or notch is to the left (Figure 2). Now connect jumper wires between the socket and the PIA as shown in Figure 3. The circled numbers refer to the pin number of the low profile socket. Make certain this is exact.

This finishes construction. Now, to explain the PIA in more detail. Actually, an entire article could easily be dedicated to understanding the PIA, but I'll do what I can. The PIA is made of six registers, three for side A and three for side B. Side B and side A perform exactly the same, so we will just look at side A. In our experiments, the PIA will be addressed at memory locations \$FF40 and \$FF41. Most numbers will be listed in hexadecimal as indicated by the \$. The PIA must first be told which direction the data will flow for each bit. This is done by use of the Data Direction Register A, or abbreviated, the "DDRA." As you can see by Figure 4 the DDRA and the Output/Input Register A, or abbreviated, "ORA" are both addressed by memory location \$FF40. The way to select which one is determined by bit #2 of the Control Register A, or abbreviated, "CRA," located at \$FF41. If a "0" is put in bit #2 of Control Register A then location \$FF40 will be addressing the DDRA. If a "1" is in bit #2 of CRA then address \$FF40 will be addressing the ORA. Now, if we put a "1" in a bit of the DDRA,

### Figure 2





# MIND YOUR OWN BUSINESS WITH HOMEBASE™

The TRS-80\* Color-Computer  
**DATABASE  
ENHANCED**

**Database Management, Word Processing and Spread Sheet Calculations in One Integrated Package**

## Business Applications

- Real Estate
- Ledgers
- Mailing Lists
- Single Letters
- Memos
- Phone Lists
- Form Letters
- Charts
- Business Reports
- Inventories
- Income Tax Preparation
- Property Maintenance
- Property Rentals
- Receivables
- Payables
- Order Entry
- Business Contacts
- Appointments
- Client Profiles
- Document/Article Indexing
- Lab Reports
- Personnel Records
- Student Grades
- Budgets

## Homebase is Easy to Use

- No programming required. All options are displayed in menus. HOMEBASE automatically requests all required data and edits every entry.
- All commands are single key stroke.
- Full screen editing for text entry.
- Complete cursor control for entering names, titles, notes, comments and all other data.
- Over 100 pages of well organized and easy to use documentation with complete descriptions of every command, and examples.
- Requires 32K of memory, DISK BASIC and only one disk drive. No equipment modifications required.
- Fast response to all commands including search and sort.

### Enhancement:

- **A tutorial/demonstration file with step-by-step instructions.**

## Custom Report Writer For Data Management Files

- Merge data management files with text files
- Print one document per data record.
- Print one document for multiple data records by using a data field as a key for matching records.
- Use all printer control options.
- Print multiple copies.
- Print selected data records.
- Store multiple formats on a single TEXT file.
- Alter formats while using the REPORT WRITER or TEXT PROCESSING program.

## Data Management

- Define 50 data fields, including a comment field, in a single record. Dates, time of day, phone numbers and dollar amounts are automatically formatted. You may also define 24 scratch-pad data fields not contained within your data records.
- Reorganize records by moving data fields within records or by moving records within a file. You may sort records in ascending or descending order using record names you assign or data values.
- Manage files by searching, deleting, clearing, duplicating, and displaying any data or record. Add, subtract, multiply, divide, or summarize any data field. Use any command on a single record or selected group of records. You may also selectively process any single data field or group of data fields.
- Print files using automatic

formatting with options to print report titles, a report date, page numbers, record names, and data field names. Print all or selected data fields or records.

### Enhancements:

- **Variable length alpha/text data fields.**
- **Use 1 or 2 disk drives.**
- **Range search for alpha/text data fields and record names.**
- **Calculator mode for entering new data field values while performing calculations and automatically displaying the results of calculations.**
- **Extended sort which permits sorting on any position within a comment alpha/text data field.**
- **Separate printer drivers for NEC and OKIDATA printers.**

## Text/Word Processing

- Define 250 screens of text you can search, sort, display, or print. Reference or select records using

record names you assign or by searching for any word or phrase within text records.

- Edit text by duplicating, moving, clearing, searching and replacing, deleting, or reordering entire records of text or portions of text records. Print the text record appearing on the screen to review before final print.
- Format labels, memos, letters, and other documents for printing with embedded printer controls for paging, skipping lines, and changing character fonts. Program controls provide for setting; right and left margins, lines per page, page width, horizontal tabs, and line spacing. Reuse control settings or change when desired. Print multiple copies. Merge text records to produce a form letter for an address file.

### Enhancements:

- **Use 1 or 2 disk drives.**
- **A separate printer driver for NEC and OKIDATA printers.**
- **Page numbering.**
- **Print page headings.**
- **Page backwards or forwards.**

## Utilities for Data Management and Word Processing

- Generating new files from old files.
- Merging files.
- Duplicating files.
- Moving data between files.
- Summarizing files.
- Moving files from diskette to diskette using a single drive.
- Saving files to cassette and reloading from cassette.
- File synchronizing.
- Print disk directory

### Enhancements:

- **Rename files.**
- **Extended summarize and update.**

**ORDER TOLL FREE 800-334-0854**

Credit card holders call toll free: 800-334-0854, extension 887 in North Carolina call: 800-672-0101, extension 887 or send a check or money order for \$75 + \$5 for handling charges to:  
**HOMEBASE™ COMPUTER SYSTEMS**  
P.O. Box 3448, Durham, N.C. 27702

90 day warranty

N.C. residents add 4% for sales tax. Allow 1 to 3 weeks delivery.

HOMEBASE™ is a trademark of HOMEBASE™ COMPUTER SYSTEMS, a subsidiary of Small Business Systems, Durham, N.C. (919) 544-5408.

\*TRS-80 is a trademark of Tandy Radio Shack, Inc.

then the corresponding bit of the ORA will be set for output. Put a "0" in a bit of DDRA and the corresponding bit of ORA will be set for input. Okay, got all that? I'm sure that all is about as clear as mud! Let me go on; an example should help. If we want to set all the ORA to output we should do as follows:

```
POKE $FF40,$FF 'SELECT DATA DIRECTION REG. A
POKE $FF40,$FF 'PUT A "1" IN EACH BIT OF DDRA
POKE $FF41,04 'CHANGE TO OUTPUT REG. A
```

Now any byte poked into \$FF40 will show up at pins 2-9 of the PIA. To set all bits as inputs we must:

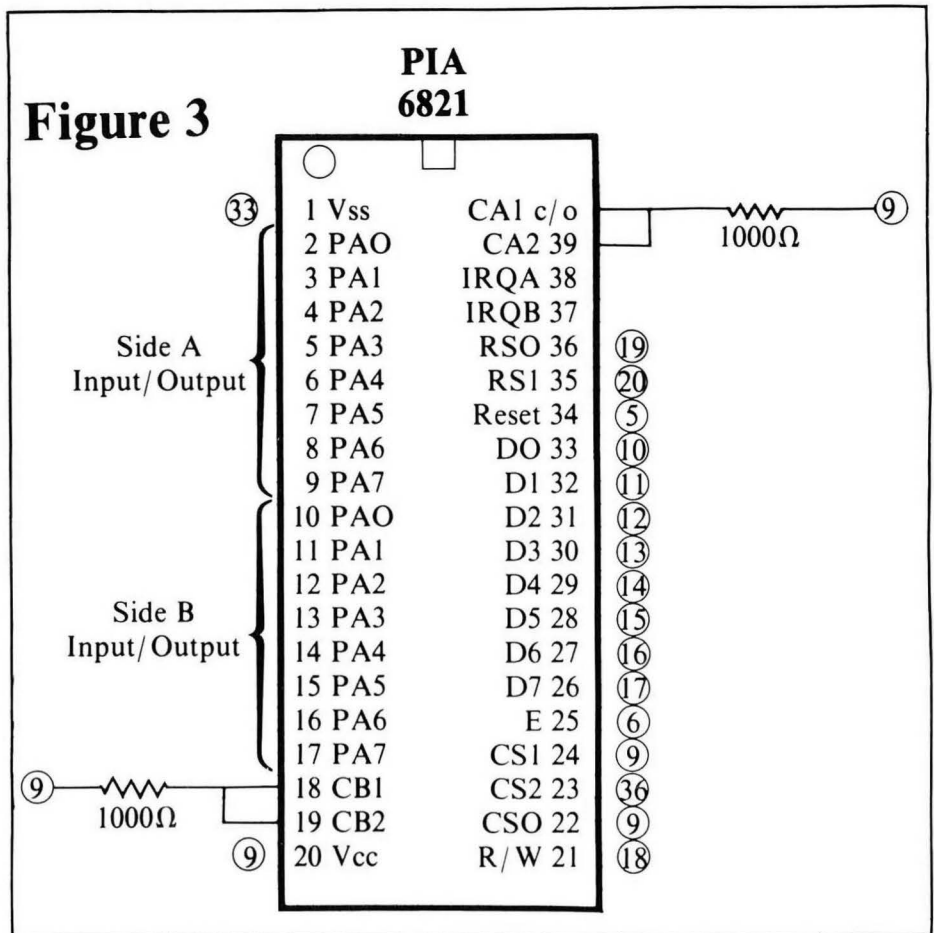
```
POKE $FF41,00 'SELECT DATA DIRECTION REG. A
POKE $FF40,00 'PUT A "0" IN EACH BIT OF DDRA
POKE $FF41,04 'CHANGE TO OUTPUT/INPUT/INPUT REG. A
```

Now anytime pins 2-9 have a logic 0 or 1 this will show up when we peek (\$FF40).

Run this next program with the PIA hooked up. Register A should be equal to zero, as shown on the screen. Use a jumper wire and connect pin #2 to pin #1. Pin #1 is ground and pin #2 is bit 0 of DDRA. Register A should now read "1." Ground pins 2-9, one at a time and watch the screen.

1 ' \*\*\*\*\* THIS PROGRAM WILL READ SIDE A OF THE PIA

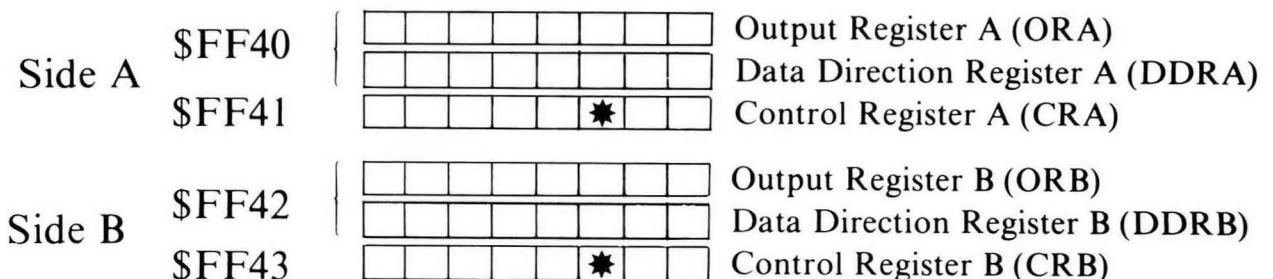
```
5 CLS
80 A=&HFF40 'LOCATION OF PIA
200 POKE A+1,00 'SELECT DATA DIRECTION REG. A
210 POKE A,00 'PUT A "0" IN EACH BIT
220 POKE A+1,04 'CHANGE TO OUTPUT/INPUT REG. A
230 P=PEEK(A) 'READ THE PIA
300 R=255-P 'LITTLE CONVERSION
310 PRINT@ 110,R 'SHOW US THE VALUE
330 GOTO 230 'READ IT AGAIN SAM
```



I can see the wheels starting to turn already... buttons... switches... a keypad... maybe I could build an alarm system... just maybe I could? Welcome to the world of interfacing. In part two I will show how to interface a calculator keyboard. This should only take about one hour. Then I'll explain more about the PIA and the different lines coming out of the CoCo. I know there has been quite a large amount of material presented here. Don't worry if you didn't understand it all—just have fun and play with the PIA. It's not necessary to understand every detail to build these projects. Just stick in there and before you know it you'll be interfacing like an old pro.

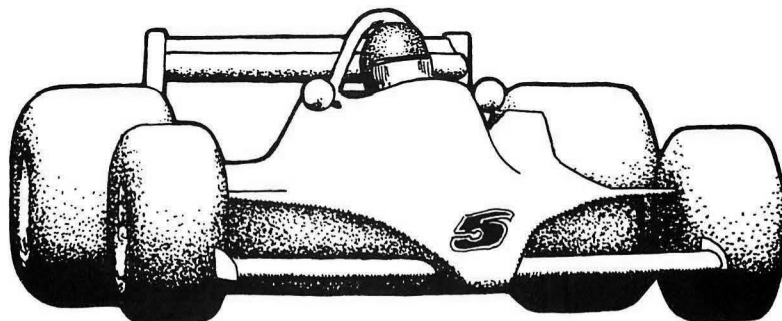
Figure 4

PIA's Internal Registers





# YOUR COLOR COMPUTER JUST GOT WHEELS!



## REVOLUTION!

You accelerate hard down a long straightaway, braking heavily at the end for a hard corner. You slice smoothly through the esses, and then boldly keep the power on for a fast sweeper. The Ferrari drifts dangerously near the edge, but you make a tiny correction in the steering, and you are through.

The finish line flashes by, and suddenly you are in the pits. The car falls silent. You see your lap times being held up. Your final lap was a new lap record! At last, you permit yourself a small smile.

You have mastered this powerful car on a difficult track, driving with the assurance and precision that comes only from long hours of practice.

You are driving an *authentic* race car. You are playing *Revolution!*

### FANTASTIC ACTION

*Revolution* uses high resolution, machine language graphics for action that is smooth and fast. The emphasis is on authenticity in the control and motion of your car. As in driving a real race car, accuracy and precision in your driving are what counts. Frills and non-essentials have been left out.

### PURE COMPETITION

Like a real race driver in practice and qualifying sessions, you compete against the clock and against the existing lap record for that track. *Revolution* records the lap records and the name of the person who set the record, so you always know who reigns supreme on your favorite track!

### DESIGNED WITH YOU IN MIND

*Revolution* is menu-driven, and self explanatory. Information screens tell you what you need to know. When you're ready to play, a menu of the names of all your tracks is displayed, along with the lap record for each track and the name of the person who set that lap record. You select a track with a single keystroke, and *Revolution* takes you there.

### A NEW CONCEPT

*Revolution* is a unique game, because it allows you to create the most important part of any race game: the track itself.

The first time you run *Revolution*, you will be able to choose from several tracks and cars which are included with the game.

But, with *Revolution*, this is only the beginning! You can create as many tracks as you like. You can make each new track as difficult or as easy as you wish. You can make easy ones to begin with, and tougher ones as you become more skilled. You may find creating tracks to be almost as much fun as driving on them!

You can save your favorite tracks to run on again whenever you wish. *Revolution* will automatically add these new tracks to the menu. And you can exchange your favorite tracks with other *Revolution* owners.

Be careful, though, about letting your friends play this game. They may not want to let you have your computer back!

### THE EARLY REVOLUTION

A prototype version of *Revolution* was published in the September, 1982 issue of *Rainbow* magazine, under the name *The Track*. The response to *The Track* has been terrific.

*Revolution* has all the features that have made *The Track* a favorite, and *Revolution's* fast, high-resolution machine language graphics are dramatically improved over the prototype's.

### REVOLUTION NOW!

The original *Revolution* for the TRS-80™ Color Computer requires 32K and one disk drive. A new cassette version has action just like the disk version, and similar track-saving features excluding a menu of available tracks. The cassette version will run on a 32K Color Computer or TDP-100. You can upgrade to the disk version later, too, for a nominal fee.

#### REVOLUTION


For 32K Disk . . . . . \$24.95

For 32K Cassette . . . \$21.95

Requires Joysticks  
& Extended BASIC

Connecticut residents add 7½% sales tax.  
TRS-80 is a trademark of Tandy Corporation.



Inter  Action



113 Ward Street • Dept. R • New Haven, CT 06519 • (203) 562-5748

# QSORT For The TRS-80 Color Computer

By C. J. Stearman

*This two part article brings to the Color Computer the fast and versatile number and string sorting routine, QSORT. In addition, we will explore the way numbers and strings are represented by Microsoft BASIC.*

Sooner or later the need arises in BASIC programs to sort large amounts of data. If you've arrived at this point and written BASIC routines to perform bubble sorts and the like, you know they can be painfully slow. Even a sort of tens of items can take upwards of a minute. Therefore, a machine code routine, callable from BASIC, would make a very useful addition to our utility program library.

Sorting is a complex science and much research has been done to discover fast, efficient methods. Unfortunately I know little of the subject and was always on the lookout for articles describing sort methods. I finally came across one describing an implementation of *Quicksort* for the TRS-80 Model 1 by Don Brumm (80 Micro, November, 1982). It

boasted some impressive sorting times; eight seconds to sort 1000 strings, 23 seconds to sort 3000!

I wanted this capability for my Color Computer and felt it worth the effort to develop a similar program. The result of this will be described in this and the next issue. I learned much about the way strings and numbers are handled by Microsoft BASIC and this knowledge is generally useful. I also discovered ways of using BASIC functions (such as RND) from machine code.

In this issue we will look at these subjects and implement the final algorithm in BASIC. The next issue will list the assembly language version and describe its operation in detail.

## Program Requirements

If the final sort program was to be really useful, it would have to be versatile, as well as fast. Probably it would be necessary to trade off some speed to ensure that versatility. I felt that it should be able to:

- \*Sort string and number arrays
- \*Sort in ascending and descending order
- \*Sort strings in any character order
- \*Sort parts of the array only
- \*Contain thorough call error detection
- \*Sort 1 and 2 dimensioned arrays
- \*Include or exclude the second dimension in 2 dimension sorts
- \*Sort either dimension in 2 dimension arrays

The desirability of some of these features will become obvious as we get into this further.

If we are to sort numbers and strings using a machine code routine it is going to be necessary to understand how these are stored by BASIC, so let's explore that next.

## Inside BASIC

BASIC used 5 bytes of storage to describe a number or string of characters. Numbers are stored in a floating point format within these 5 bytes. In the case of strings, the 5 bytes contain details of where the string is and how long it is. The string itself is elsewhere in memory. It is important to note that the Color Computer has no capability to store numbers as integers. This fact will figure in some decisions later.

*(Mr. Stearman is Field Engineering Manager for Boston Digital Corp., a manufacturer of precision, computer-controlled milling machines. He was born and educated in England and has lived in the U.S.A. since 1970.)*

## COMPUTERS UNLIMITED

(803) 877-0269

*Before you buy somewhere else, give us a call!*

|                          | Tape    | Disk    |
|--------------------------|---------|---------|
| <b>DATASOFT</b>          |         |         |
| Moon Shuttle (16K) ..... | \$27.95 | \$27.95 |

| <b>TOM MIX</b>            |         |         |
|---------------------------|---------|---------|
| Donkey King (32K) .....   | \$19.95 | \$24.95 |
| Space Shuttle (32K) ..... | \$24.95 |         |
| Trap Fall (16K) .....     | \$24.95 | \$26.95 |

| <b>INTRACOLOR COMMUNICATIONS</b> |         |         |
|----------------------------------|---------|---------|
| Colorpede (16K) .....            | \$26.95 | \$29.95 |
| Robottack (16K) .....            | \$19.95 | \$24.95 |

*Specials* **ZAXXON (32K) - \$29.95**  
**AMDISK III - \$499.95**

| <b>PRINTERS</b>                            |          |
|--------------------------------------------|----------|
| Okidata 82A .....                          | \$389.95 |
| We also handle all other Okidata products! |          |
| C.I.TOH Prowriter (Parallel) .....         | \$385.95 |

| <b>ACCESSORIES</b>                    |         |
|---------------------------------------|---------|
| Super-Pro Keyboard Kit .....          | \$62.95 |
| We also carry TRS-80 Color Computers. |         |

This is just a partial list — call or write for catalog!!

TERMS: Money order and your personal checks welcome.  
Shipping - \$2.00 for software, 2% for hardware.  
C.O.D. please add \$2.00 — S.C. residents add 4% sales tax.

**COMPUTERS UNLIMITED • RT. 7 JOHNSON ROAD  
GREER, S.C. 29651 • (803) 877-0269 9a.m. to 9p.m. E.S.T.**



# FINALLY!

## A REAL SPREAD-SHEET PROGRAM FOR THE COLOR COMPUTER

# DYNACALC™

Business people use spread-sheets to organize columns and rows of figures. DYNACALC simulates the operation of a spread-sheet without the mess of paper and pencil. Of course, corrections and changes are a snap. Changing any entered value causes the whole spread-sheet to be re-calculated based on the new constants. This means that you can play, 'what if?' to your heart's content.

But DYNACALC isn't just for accountants. DYNACALC can be used for just about any type of job. Not only numbers, but alphanumeric messages can be handled. Engineers and other technical users will love DYNACALC's sixteen-digit math and built-in scientific functions. There's even a built-in sort command, so you can use DYNACALC to manage small data bases - up to 256 records.

DYNACALC will let your computer do just about anything you can imagine. Ask your friends who have VisiCalc, or a similar program, just how useful an electronic spread-sheet program can be for all types of household, business, engineering, and scientific applications.

DYNACALC is designed to be used by non-programmers, but even a Ph.D. in Computer Science can understand it. Built-in HELP messages are provided for quick reference to operating instructions.

DYNACALC has a beautifully simple method of reading and writing FLEX data files, so you can communicate both ways with other programs on your system, such as the Text Editor, Text Processor, Sort/Merge, RMS data base system, or other programs written in BASIC, C, PASCAL, FORTRAN, and so on.

Except for a few seldom-used commands, DYNACALC is memory-resident, so there is little disk I/O to slow things down. The whole data array (worksheet) is in memory, so access to any point is instantaneous. DYNACALC is 100% 6809 machine code for blistering speed.

Color Computer DYNACALC works with the FLEX operating system from Frank Hogg Laboratory (64k required). If you aren't already using this powerful operating system, we have a special deal for you: order DYNACALC (regularly \$200) and FHL Color FLEX (regularly \$99) together for only \$250.

To order, see your local DYNACALC dealer, or order directly from CSC at the address below. We accept telephone orders from 10 am to 6 pm, Monday through Friday. Call us at 314-576-5020. Your VISA or MasterCard is welcome. Be sure to specify that you want the Color Computer version.

## ORDER YOUR DYNACALC TODAY!

Computer Systems Center  
13461 Olive Blvd.  
Chesterfield, MO 63017  
(314) 576-5020



## Strings

Looking at the 5 byte descriptor for a string, we find that the first byte contains a count of the number of characters in the string, and the third and fourth contain a 16 bit address of the first character. With these two pieces of information the whole string can be accessed. The second and fifth bytes are "reserved for the computer" to quote the manual, and seem to always be zero. So string descriptors are simple to understand.

## Numbers

By comparison, numbers are much more complex. These 5 bytes must store a decimal number in the range  $\pm 10^{38}$ ! To do this, the number must be stored as a binary value in the form:

$$\text{MANTISSA} \times 2^{\wedge} \text{EXPONENT}$$

where the mantissa is a 32 bit, signed binary number in the range:

1.0000000 00000000 00000000 00000000 (Base 2)

to

1.1111111 11111111 11111111 11111111 (Base 2)

and the exponent is an 8 bit, signed binary number in the range:

-126 to +126 (Base 10)

No doubt this looks pretty confusing! However, it is akin to the practice of representing numbers in scientific notation. For example, the decimal value 123.456 can be represented as  $1.23456 \times 10^2$ . Or the decimal number -0.00123 becomes  $-1.23 \times 10^{-3}$ . This action is called normalizing. In binary normalized numbers the mantissa is always in the signed range of 1 to 2 (inclusive of 1 but exclusive of 2).

Looking at the way BASIC actually stores this, the first

byte contains the exponent. If the Most Significant Bit (MSB) is a zero the exponent is negative, if a 1 it's positive. The remaining 7 bits describe the value of the exponent "plus one." This "wrinkle" is needed because the number "zero" is a special case. It is represented by the exponent byte being zero. In this case, the 4 mantissa bytes are immaterial. However, an exponent of zero is a valid value, so the exponent must be "offset" by one to allow for its representation. This also explains why the exponent range is 126, not 127. Exponent 126 is stored as 127, the highest value which can be contained in 7 bits.

As the mantissa is always "one point something," this 1 can be assumed, and the MSB of the most significant byte can be used to store its sign. This time a 1 indicates negative, and a 0 positive.

If you're thoroughly confused now, let's look at a couple of examples. Take the decimal number 9.625 and "code" it first. It is represented in binary by 1001.101 (going from the binary point right, the 1 represents  $1\frac{1}{2}$ ; then  $\frac{1}{4}$ ;  $\frac{1}{8}$  etc.). Normalizing this, it becomes  $1.001101 \times 2^3$  ( $2^3$  shown in decimal). The mantissa is positive, as is the exponent so the result is:

Byte 1 : 10000100 (exponent+1)  
Byte 2 : 00011010 (sign + fraction)  
Byte 3 : 00000000  
Byte 4 : 00000000  
Byte 5 : 00000000

As a second example, take the value -0.09375 (decimal). This is -0.00011 in binary. Normalizing it becomes  $-1.1 \times 2^{-4}$  (mantissa in base 2, rest in base 10). Converting according to the rules above:

Byte 1 : 01111101 (negative, -4+1 in 7 bit 2's complement)  
Byte 2 : 11000000 (negative and fraction part)  
Byte 3 : 00000000  
Byte 4 : 00000000  
Byte 5 : 00000000

Having nearly 32 bits to represent the mantissa provides the ability to handle decimal numbers with 9 significant digits. Using the normalized format with an exponent of 7 bits allows the large value range.

## Floating Point Accumulator


Numbers are stored in memory as described above. However, when a BASIC function uses them they are passed through the Floating Point Accumulator (FAC). This is six bytes in memory starting at 6F (Hexadecimal). Note it is six, not five. Numbers are represented in it slightly differently from in memory. Bytes 1, 3, 4 and 5 are the same. Byte 6 in the FAC is the same as byte 2 in memory. Byte 2 in the FAC is the same as byte 2 in memory, except that the MSB is always 1. This arrangement allows byte 6 to represent the mantissa sign, while bytes 2 through 5 represent the true absolute value of it.

## Arrays

When a string or number array is dimensioned in BASIC, a section of memory is used to represent it. The section comprises a header and then groups of 5 byte descriptors. This is true for either number or string arrays. In the former the 5 bytes contain the array element value; in strings, the length and pointer to the string.

The header provides general details of the array. In the order of storage, the header contains:

Byte 1 = First letter of name  
Byte 2 = Second letter of name (+128 if a string array)



## YOUR SEARCH IS OVER

The Software Connection of Ft. Lauderdale is your one stop source for your Color Computer Software and Peripherals.

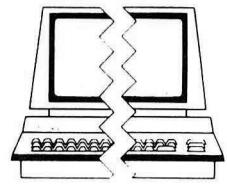
WE FEATURE A COMPLETE SELECTION OF SOFTWARE FROM MOST SUPPLIERS AT DISCOUNTED PRICES!

|                                                                        |                                                                         |
|------------------------------------------------------------------------|-------------------------------------------------------------------------|
| <b>TDP (Tandy) COLOR COMPUTER</b><br>16K Regular Basic<br><b>\$195</b> | <b>TDP (Tandy) COLOR COMPUTER</b><br>16K Extended Basic<br><b>\$295</b> |
|------------------------------------------------------------------------|-------------------------------------------------------------------------|

**64K UPGRADES** (E/F boards) \$85 • (D boards w/1.1 rom) \$95

**SECS BOX (Serial Electronic Communication Switch)**  
Switch from printer to modem or other device without removing jacks from your computer  
With three outlets and pilot light to confirm transmission.  
**\$39.95**

**Repairs done on all color computers at reasonable prices**  
When in Ft. Lauderdale be sure to visit our retail store.



## THE SOFTWARE CONNECTION, INC.

5460 No. State Rd. 7, Suite 108  
Fort Lauderdale, (under the Loft Restaurant)  
(305) 484-7547



# Computerware Proudly Presents...

from our long list of Color Computer software for home, work, business and programmers . . .



Your Lady Bug hussles thru an intricate maze of barriers & turnstiles, avoiding enemy bugs & skulls.  
**Cass \$24.95      Disk \$29.95**



Turn your keyboard into a musical instrument with a digital synthesizer.  
**Cass \$21.95      Disk \$26.95**



Centipedes & caterpillars are tame compared to the challenge & aggression in this great game!  
**Cass \$21.95      Disk \$26.95**



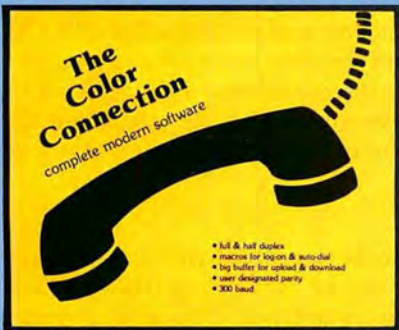
You must dive thru shark infested waters to get the treasure. Timing & strategy are crucial . . .  
**Cass \$21.95      Disk \$26.95**



New! Improved! The most realistic graphics arcade game ever!  
**Cass \$24.95      Disk \$29.95**



Your Rail Runner must scurry over busy tracks dodging trains & handcars to rescue the hoboel!  
**Cass \$21.95      Disk \$26.95**



Full feature modem software. Load & save from RAM Buffer, Macros, any duplex or parity, much more . . .  
**Cass \$29.95      Disk \$39.95**



Complete editor & word processor with 51 x 24 upper & lower case display.  
**Disk \$49.95**



Modifies screen display to 51 x 24 for BASIC & your other software.  
**Cass \$24.95      Disk \$29.95**

Add shipping of \$2 surface or \$5 air/Canada. Visa & MasterCard accepted. Dealer inquiries invited. Computerware® is a trademark of Computerware.®



P.O. Box 668, Encinitas, CA 92024 (619) 436-3512



Byte 3 & 4 = 16 bit count of total bytes used by the array, including the header

Byte 5 = Number of dimensions

Byte 6 & 7 = 16 bit count of elements in last dimension

Byte 7 & 8 = Ditto for next to last dimension

Byte 9 & 10 = Ditto for first dimension

Byte 11 = First byte of 5 byte descriptor of "zeroth" element

This is for an array with 3 dimensions. If more or less, then more or less byte pairs are needed to detail the number of elements in each dimension. So it is immediately obvious that the number of bytes in the header is dependent upon the number of dimensions.

The elements of the array itself are stored in an order with the leftmost dimension varying most rapidly. The array A(3,2,1) will be stored in ascending memory in the order:

A(0,0,0)

A(1,0,0)

A(2,0,0)

A(3,0,0)

A(0,1,0)

A(1,1,0)

A(2,1,0)

A(3,1,0)

A(0,2,0)

A(1,2,0)

A(2,2,0)

A(3,2,0)

A(0,0,1)

A(1,0,1)

ETC.

Knowing the address of the "zeroth" element thus enables us to locate any subscript descriptor in the array.

### The VARPTR Function

Extended BASIC provides this function which returns the address of the variable descriptor supplied as its argument. This can be used to pass an array pointer from BASIC to a machine code routine. For example, the call X=USR (VARPTR(A(0,0))) will pass the address of the first byte of the 5 byte descriptor for that subscript variable. The machine code function INTCNV will put this value in register D of the microprocessor. Knowing the address of the "zeroth" element also provides us with the location of the array header.

A word of caution is needed! BASIC moves the variables around in memory when a new one is introduced. So a new variable must not be created after a call to VARPTR before the result is used, as the value will no longer be valid. This can best be avoided by pre-assigning the variables at the beginning of the program.

### Using BASIC Functions

As we will see later, one of the requirements of the Quicksort Routine is the generation of a random number. Another is the conversion of a floating point number in the FAC to a 16 bit integer. The second requirement is already available through a routine documented in the BASIC manual. It is called INTCNV and its address is B3ED (hexadecimal).

However, the function which performs the RND function is not documented. Fortunately there's a book called "The Facts for the TRS-80 Color Computer" published by Spectral Associates, which provides a considerable amount of information about the routines in BASIC. Amongst other data, it provides the dispatch table for the BASIC functions. The RND function happens to be at BF1F (hexadecimal). I speculated that this probably took the argument from the FAC and returned a random number from 1 to the argument to the FAC. Experimentation showed this to be so. Tests on other functions such as MEM, which returns the available memory, worked in a similar manner.

With access to these functions, all that was required was a method of getting the FAC value into register D as a 16 bit integer (the INTCNV routine mentioned earlier), and another to do the reverse. This proved more difficult. BASIC does have a documented routine called GIVABF (at B4F4 hexadecimal) but this does too much and is really only useful for returning an integer value to a variable in BASIC. So I was forced to write my own for the QSORT program. This has limited capability but does adequately for the needs here.

### Quicksort

We now have the tools to proceed with the sort routine. The general principle will be to exchange descriptors in the array so that it becomes ordered. This will conveniently handle both strings and number arrays. In the case of strings this has the advantage of making it unnecessary to move the actual strings themselves.

### The Algorithm

Quicksort is a fast and simple process, but does entail considerable "housekeeping." To help follow it through, listing 1 shows its implementation in BASIC.

The general procedure involves the ordering of a partition. Initially the whole array is taken as a partition. An element is selected from this partition and designated the

## MYSTERIOUS ISLE

### GREAT NEW TEXT ADVENTURE GAME!

*You vaguely remember being put in the lifeboat as the ship was sinking. Now you awaken on the beach of MYSTERIOUS ISLE . . . alone in the small battered boat. Can you find the pirate's fabulous treasure and escape with it and your life!!*

**TRS-80 Color Computer\***

Requires 16K Extended Basic

**CASSETTE \$21.95**

including postage

Send check or money order to:

**Computer Dynamics**

3640 Summitridge Lane

Orange, California 92667

\*TM Tandy Corp.



# JUST GOOD SOFTWARE

REVIEW DATES  
\*RAINBOW  
\*JAN '83

**DISK DOUBLE ENTRY** - If you have spent hours trying to balance your Debits and Credits, this program is for you! Designed for small business, club, and personal use. Enter transactions in a journal type format. Program will maintain current account balances, produce Trial Balance, Income, and Balance Sheet reports and complete Account Ledgers. Will handle up to 300 accounts including report headings and totals. Up to 1400 average transactions on a diskette. Summary reports and four levels of subtotals available. REQUIRES 32K and a user understanding of standard double entry accounting concepts. - \$44.95 in BASIC with Machine Language subroutines.

**DISK DATA HANDLER** - 64K - Designed to use the full 64K RAM, but may also be configured for 32K. Uses standard ROM's - No special operating system required! Allows you to design disk data files for your specific needs. You define a basic record of up to 14 fields and 246 characters. Provides fast selection and sorting based on any field or combination of fields in this record. Powerful on-screen input and update. User defined output of reports to screen, printer, or disk files which may be read by your BASIC programs for any computational or special formatting requirements. Printer reports allow headings, page breaks, and page numbering, and let you pass control codes to drive your printer's special features. Maximum number of records you may work with at one time will depend on RAM configuration and record size - 64K (32K) 1850 (500) - 21 char records, 179 (49) - 246 char records. An optional Extended record linked to the basic record may also be defined. The size of this Extended record is not a factor in determining maximum number of records. Will provide the growth capability needed for your increasingly sophisticated applications. \$54.95 in BASIC with Machine Language subroutines.

\*OCT '82

**DISK DATA HANDLER** - 32K only version - as above, but without report headings, page breaks, or printer control codes. \$44.95

**DATE-O-BASE CALENDAR** - Puts you in charge of your schedule! Graphically displays any monthly calendar between 1700 and 2099. You put in up to twelve 28 character memos per day - calendar shows where the memos are - call up of day shows details. Use for appointments and a log of past activity. Study the chronology of the American Revolution or note the day your mortgage will be paid off. Search capability allows you to list or print all memos between two specified dates or only ones meeting key word criteria. Date computation shows elapsed time between two dates in days, weeks, months, and years. REQUIRES 32K in BASIC.

\*JUNE '82

TAPE DATE-O-BASE CALENDAR - \$16.95  
(max. 400 memos/tape file)

DISK DATE-O-BASE CALENDAR - \$19.95  
(over 4,000 memos/disk - max. 300 memos/month)

**MATH TUTOR** - Five programs that go from math fact (+, -, X, /) drill to full addition, subtraction, multiplication, and division at four levels of difficulty. Provides a step by step approach with error correction and rewards for good performance. - \$13.95 in BASIC.

\*SEP '82

**SPELLING TEACHER** - Up to 200 of their spelling words stored on tape or disk are presented in four lively study modes including a scrambled word game. - \$12.95 in BASIC.

\*SEP '82

**ALPHA-DRAW** - A subroutine designed to let you easily add characters to your graphic displays. You define X and Y coordinates and a string variable of one or more characters and Alpha-Draw will do the rest. Includes all keyboard characters. Comes with instructions for a true line numbered merge of tape files. Works great with the Screen Print program! - \$8.95 in BASIC.

\*AUG '82

**GRAPHIC SCREEN PRINT PROGRAM** - Works in ALL PMODES and lets you shift screen image anywhere on the printed page. Relocatable code lets you use all of your 16K or 32K machine. Available for both Color Basic 1.0 and 1.1. Use EXEC 41175 to see which you have and SPECIFY with order. In Machine Language.

\*MAY '82

\$7.95 - For TRS-80® LP-VII/VIII & DMP 100/200/400 (specify printer type)

\$9.95 - For Epson GRAFTRAX®, PROWRITER®, NEC® PC 8023A-C  
Microline® 82A/83A (with OKIGRAPH® I), Microline 84  
IDS-440/445, Paper Tiger® 460/560, Micro Prism® 480, Prism® 80/132 (with dot plotting)  
Micro Peripherals, Inc. 88G/99G, Centronics 739, Star Micronics, Inc. GEMINI-10/15  
(Trademarks of Tandy Corp., Epson America, Inc., C-Ittoh, NEC America, Okidata Corp., Integral Data Systems, Inc.)

ALL PROGRAMS require Extended Color Basic and are delivered on cassette. All, except Tape Date-O-Base Calendar, are DISK System compatible.

*We want your  
SUGGESTIONS!*

## Custom Software Engineering, Inc.

807 Minutemen Causeway (D-2), Cocoa Beach, Florida 32931  
(305) 783-1083



For VISA and Master Card orders:  
Include type, account number, expiration  
date, signature and phone number.  
Sorry! No COD's.



U.S. and CANADA add \$1.00 per order for shipping.  
Overseas \$2.50 per order. All prices in U.S. dollars.  
Florida residents add 5% sales tax. Return within two  
weeks if not completely satisfied.



ALL LISTED  
PROGRAMS

comparand. Then each element is compared with this, starting from the low end. When one is found which is equal to or greater than the comparand, its subscript is noted. The scan is then started from the high end, looking for an element which is equal or lower than the comparand. When one is found, it is swapped with the element found on the upward scan. This is only done however, if the upward scan element was originally below the downward scan one. If so, then the upward and downward scan continues from where it left off, performing similar swaps.

Eventually the selected element on the upward scan will not be below the one on the downward. At this point the selected elements will either be the same one, or the upward higher than the downward. The result is an array with all the elements below the upward scan selected element being equal or less than the comparand. All elements above the downward scan selected element will be equal to or higher than it.

The partition must now be split into two separate partitions. Then each partition has the same action performed on it, until every partition is reduced to one element. When all partitions have been so reduced, the array is sorted.

The partition to be divided is split into one with all elements up to but not including the upward scan selected element. The other is made up of those elements from the downward scan, in a similar fashion. It is apparent from this that the data defining one partition must be saved while the other is further scanned. If the original array is limited to 4096 elements and the data on the larger of the two resulting partitions is saved while the other is scanned, then the divid-

ing process cannot result in more than 12 lots of data being stored at any one time. This is due to the fact that 4096 cannot be divided by two more than 12 times before the result is unity. This is verified by the fact that  $4096 = 2^{12}$ .

This seemingly complex process is in fact extremely fast. Also its speed varies roughly linearly with number of elements. Bubble sort times, in contrast, increase as the square of the number of elements.

### Selecting The Comparand

The comparand is ideally chosen so that there are approximately equal numbers of elements in the resulting two partitions. To obtain this a median value should be chosen, as this will have as many elements lower than it as higher. Unfortunately, the process of calculating median values is itself time consuming. To avoid this problem, the comparand element is chosen at random from the partition. With larger enough partitions, the average result will be satisfactory. However, when partitions become small, this is not so. To avoid this problem another simpler routine is used to sort the partition when it contains 10 or less elements. The routine used here is a form of bubble sort which I have called Easysort. It is simple in function and can be readily understood from the BASIC in listing 1. Experimentation showed about a 25 percent improvement in overall speed when this hybrid approach was used.

### The BASIC Version

I chose to test my understanding of the algorithm by first implementing it in BASIC. Of course, there is nothing preventing the use of this in your BASIC programs. It is surpris-

# The Original FLEX for Color Computers

- \* Upgrade to 64K
- \* RS to FLEX, FLEX to RS file transfer ability
- \* Create your own character set
- \* Automatic recognition of single or double density and single or doubled sided
- \* All features available for either single or multiple drive systems
- \* Settable Disk Drive Seek Rates
- \* Faster High Resolution Video Display with 5 different formats
- \* Save RS Basic from RAM to Disk
- \* Move RS Basic to RAM
- \* Load and save function on FLEX disk
- \* 13 Support Commands 8 with Source Text

#### Languages Available

Pascal, Fortran, RS Basic, RS Assembler, TSC Basic, TSC Assembler, Relocating Assembler, Macro Assembler, Mumps

If you are tired of playing games on your TRS-80C™ Color Computer, or find that you are handicapped by the limitations of the RS BASIC in trying to write a Program that will allow you to actually USE the Color Computer as a COMPUTER, YOU ARE READY TO MOVE UP TO THE FLEX™ Operating System. If you want to have REAL PROGRAMMING POWER, using an Extremely Powerful Business BASIC, PASCALS, C Compilers, a full-blown Macro Assembler with a Library capability so you are not continuously "reinventing the wheel", YOU ARE READY TO MOVE UP TO THE FLEX™ Operating System. If you would like to see if YOU REALLY COULD USE A COMPUTER IN YOUR BUSINESS, or begin to make your Computer start PAYING IT'S OWN WAY by doing some Computer Work for the millions of small businesses around you, such as Wordprocessing, Payroll, Accounting, Inventory, etc., then YOU ARE READY TO MOVE UP TO THE FLEX™ Operating System. How?? DATA-COMP has the way!

DATA-COMP's FLEX™ Conversion for the TRS-80C™ Color Computer was designed for the SERIOUS COMPUTER USER; with features like greatly increased Display Screens, WITH Lower Case Letters, so you can put a FULL Menu on ONE Screen, or see SEVERAL Paragraphs at the same time; with features like providing a FULL Keyboard so you have FULL Control of your Computer AND it's Programs NATURALLY, without needing a chart to see what Key Combination will give you what function; with USER ORIENTED functions to make using the Operating System natural, like having the Computer AUTOMATICALLY determine what type of Disk is being used in what type of Disk Drive and working accordingly, rather than you have to specify each and every thing for it, or like having the Computer work with the Printer you have been using all along without you having to tell the new Operating System what is there; etc., etc., etc.

DATA-COMP has everything you need to make your TRS-80C™ Color Computer WORK for YOU; from Parts and Pieces to Full, Ready To Use SYSTEMS. DATA-COMP designs, sells, services, and SUPPORTS Computer SYSTEMS, not just Software. CALL DATA-COMP TODAY to make your Computer WORK FOR YOU!

#### System Requirements

|                                                                                                             |          |
|-------------------------------------------------------------------------------------------------------------|----------|
| FLEX9 Special General Version x Editor & Assembler (which normally sell for \$50.00 ea.)                    | \$150.00 |
| F-MATE(RS) FLEX9 Conversion Rout. for the RS Disk Controller when purchased with Special General FLEX9 Sys. | \$69.95  |
| when purchased without the General FLEX9 Sys.                                                               | \$79.95  |
| Set of Eight 64K RAM Chips w/Mod. Instructions                                                              | \$69.96  |
| Color Computer with 64K RAM and EXT. BASIC                                                                  | \$499.95 |
| Color Computer with 16K RAM                                                                                 | \$289.95 |
| Color Computer with 16K RAM and EXT. BASIC                                                                  | \$389.95 |

#### SPECIAL SYSTEM PACKAGES

64K Radio Shack COLOR COMPUTER, Radio Shack COLOR DISK CONTROLLER, a Disk Drive System, Special General Version of FLEX9™, F-MATE(RS)™ and a Box of 10 Double Density Diskettes; a COMPLETE, ready to run SYSTEM on your Color TV Set. \$1249.95

#### DISK DRIVE PACKAGES, etc.

These Packages include the Radio Shack Disk Controller, Disk Drives with Power Supply and Cabinet, and Disk Drive Cable:

|                                                            |          |
|------------------------------------------------------------|----------|
| PAK #1 — 1 Single Sided, Double Density Sys.               | \$499.95 |
| PAK #2 — 2 Single Sided, Double Density Sys.               | \$769.95 |
| PAK #3 — 1 Double Sided, Double Density Sys.               | \$599.95 |
| PAK #4 — 2 Double Sided, Double Density Sys.               | \$949.95 |
| PAK #5 — 2 Queme Thinline Double Sided Double Density Sys. | \$764.95 |

#### PARTS AND PIECES

|                                                  |          |
|--------------------------------------------------|----------|
| Radio Shack Disk Controller                      | \$179.95 |
| 1 Tandon Single Sided, Double Density Disk Drive | \$249.95 |
| 1 Tandon Double Sided, Double Density Disk Drive | \$349.95 |
| 1 Queme Thinline Double Sided, Double Density    | \$279.95 |
| Single Drive Cabinet with Power Supply           | \$89.95  |
| Double Drive Cabinet with Power Supply           | \$109.95 |
| Single Drive Disk Cable for RS Controller        | \$24.95  |
| Double Drive Disk Cable for RS Controller        | \$34.95  |
| Micro Tech. Prods., Inc. LOWER CASE ROM Adapter  | \$74.95  |
| Radio Shack BASIC Version 1.1 ROM                | \$34.95  |
| Radio Shack Extended Basic ROM                   | \$89.95  |

**DATA-COMP**

P.O. Box 794 HIXSON, TN 37343

1-615-842-4601







```

90 NEXT I
100 PRINT "SORT BEGINS"
110 TIMER=0
120 GOSUB 200
130 GOSUB 1000
140 RUN
200 B=0:E=SIZE
210 LI=0:RI=SIZE
220 PTR=0
230 IF E-B>10 THEN GOSUB 500 ELSE
GOSUB 1200:GOTO380
300 LSZ=(LI-1)-B
310 RSZ=E-(RI+1)
320 IF LSZ=RSZ THEN 350
330 IF LSZ>RSZ GOSUB 750 ELSE GO
SUB 850
340 GOTO 370
350 IF LSZ<=0 THEN 380
360 GOSUB 760
370 IF (E-B)<=0 THEN 380 ELSE 230
380 IF (PTR)=0 THEN RETURN
390 GOSUB 950
400 GOTO 230
500 CMP=N(RND(E-B+1))+B-1)
550 FOR LI=LI TO E
560 IF N(LI)=>CMP THEN 600
570 NEXT LI

```

```

600 FOR RI=RI TO B STEP-1
610 IF N(RI)<=CMP THEN 700
620 NEXT RI
700 IF LI<RI THEN T=N(LI):N(LI)=
N(RI):N(RI)=T:LI=LI+1:RI=RI-1:GO
TO550
710 RETURN
750 IF LSZ<=0 THEN 790
760 LS(PTR)=B
770 RS(PTR)=LI-1
780 PTR=PTR+1
790 B=RI+1
800 RI=E
810 RETURN
850 IF RSZ<=0 THEN 890
860 LS(PTR)=RI+1
870 RS(PTR)=E
880 PTR=PTR+1
890 E=LI-1
900 LI=B
910 RETURN
950 PTR=PTR-1
960 B=LS(PTR)
970 E=RS(PTR)
980 LI=B:RI=E
990 RETURN
1000 T=TIMER
1010 PRINT#DV,STRING$(30,"*")
1020 PRINT#DV,"ARRAY SIZE WAS ";
SIZE
1030 PRINT#DV,USING"SORT TIME WA
S ###.## SECONDS";T/60
1040 PRINT#DV,"CALLS TO EASISORT
=";CL
1050 FOR I=0 TO SIZE-1
1060 IF N(I)>N(I+1) THEN 1100
1070 NEXT I
1080 PRINT#DV,"SORT WAS SUCCESSF
UL"
1090 GOTO 1110
1100 PRINT#DV,"SORT WAS UNSUCCESSFUL"
1110 PRINT#DV,STRING$(30,"*")
1120 RETURN
1200 K=B
1210 CL=CL+1
1220 K=K+1
1230 IF K>E THEN RETURN
1240 IF N(K)>=N(K-1) THEN 1220
1250 TN=N(K)
1260 I=K
1270 N(I)=N(I-1)
1280 I=I-1
1290 IF I=B THEN 1310
1300 IF TN<N(I-1) THEN 1270
1310 N(I)=TN
1320 GOTO 1220

```



## OWLS NEST SOFTWARE

' WE GIVE A HOOT '

16K EXTENDED BASIC UNLESS NOTED.

**LABEL III** — develop and maintain a mailing list.  
Print lists or labels in your choice of 1, 2, or 3 wide.  
Supports 3 or 4 line addresses — phone optional.



\$19.95

**PROGRAM FILE** — organize your cassette files.  
Create and maintain a four field file. Search, sort,  
modify, delete, and display on screen or printer.

\$14.95

**DISASSEMBLER — ASSEMBLER** (by Dynamic  
Electronics) - Designed for the beginner who wants to  
learn to write machine language programs.  
(EXTENDED BASIC NOT REQUIRED)

\$19.95

CASSETTE TAPES C-05  
\$7.50 - Dozen \$9.50 - DOZEN WITH BOXES  
PLEASE ADD \$1.50 PER DOZEN  
SHIPPING HANDLING



OWLS NEST SOFTWARE  
P. O. BOX 579  
OOLTEWAH, TN 37363



## A WORD FROM THE SPONSOR

Number five in these chats, and it is still too early to judge the results in our *Name the Column* contest. But I have received some excellent entries, and will have the winner next month. Stay tuned.

At this point, I'd like to thank a few more magazines for giving our products great reviews in the past few months — in March, *Color Computer News* reviewed NEWTALK and *Rainbow* reviewed REMOTERM, while in April 80 *Micro* reviewed STAR-DOS. They all loved them . . . naturally.

This month I thought you might be interested in some of my cassette procedures.

While a number of outfits make leaderless computer cassettes, I distrust them. From my audio days, I know that the beginning and end of a reel-to-reel or cassette tape tend to get crinkled and develop dropouts. This can destroy a program copy, and so I wouldn't use the beginning of a leaderless tape anyway. In that case, why pay extra for leaderless tape when you don't use it?

Instead, I buy 10-minute C-10 cassettes. These cassettes are available from a variety of sources, and cost about 50 to 80 cents each. I prefer to use one cassette per program, rather than put many programs on one tape and then have to search for them.

All of these tapes have a leader, and so when you use them you must be careful not to record your program on the leader instead of the tape. Using fast forward to get past the leader may leave a bit of an old program on the tape just before the new one, and CoCo will have trouble separating them. Instead, my method is to do the following: First, make sure the tape is fully rewound. Then place the recorder in RECORD, and type the command MOTOR ON on the computer. This starts the recorder motor, so that you are recording although the computer is not yet writing anything to tape. This erases the beginning of the tape. In the meantime, type your CSAVE or CSAVEM command, but do not hit ENTER until you see that the tape is well past the leader. I usually give it about ten seconds before typing ENTER. This procedure not only makes sure that I get past the leader, but also guarantees that there is blank space before the program to make reading it easier. Works every time.

For the disk users among you, I would like to announce two new products: STAR-DOS 64 and STAR FLEX. Both are disk operating systems for 64K computers. STAR FLEX is the famous FLEX system by Technical Systems Consultants, adapted for the CoCo, while STAR-DOS 64 is our own STAR-DOS, but modified for 64K computers. Both come with high resolution screens and have many features for the more advanced disk user. STAR FLEX is, of course, compatible with the large amount of software developed over the years for FLEX systems. STAR-DOS 64 will also run much of that software, but its big advantage (besides the fact that it is cheaper) is that its disk format is the same as Radio Shack's.

If you do not have a 64K system, then by all means consider the original STAR-DOS. The upgrade from STAR-DOS to STAR-DOS 64 is just the price difference between the two, so you can upgrade at any time. (But before getting any DOS for your CoCo, read our February advertisement!)

That's it for this month. Until June, just remember: *On a Clear Disk, You Can Seek Forever.*

*Peter Stark*

## STAR-KITS

### SPELL 'N FIX

Regardless of whose text processor you use, let SPELL 'N FIX find and fix your spelling and typing mistakes. It reads text faster than you can, and spots and corrects errors even experienced proofreaders miss. It is compatible with all Color Computer text processors. \$69.29 in the Radio Shack disk or cassette versions; \$89.29 in the Flex version. (20,000 word dictionary is standard; optional 75,000 word Super Dictionary costs \$50 additional.)

### HUMBUG — THE SUPER MONITOR

A complete monitor and debugging system which lets you input programs and data into memory, list memory contents, insert multiple breakpoints, single-step, test, checksum, and compare memory contents, find data in memory, start and stop programs, upload and download, save to tape, connect the Color Computer to a terminal, printer, or remote computer, and more. HUMBUG on disk or cassette costs just \$39.95, special 64K version for FLEX or STAR-DOS 64 costs \$49.95.

### STAR-DOS

A Disk Operating System specially designed for the Color Computer, STAR-DOS is fully compatible with your present Color Computer disk format — it reads disks written by Extended Disk Basic and vice versa. STAR-DOS for 16K or 32K systems costs \$49.90; STAR-DOS 64 for 64K systems costs \$74.90.

### STAR FLEX

The best implementation of FLEX for the Color Computer. Complete with all utilities, text editor, macro assembler, and HUMBUG debug monitor, \$250.00.

### ALL IN ONE — Editor Etc.

Three programs in one — a full function Editor, a Text Processor and a Mailing List/Label program. All this for just \$50. Requires STAR-DOS and 32K, or STAR-DOS 64, or FLEX, specify which.

### DBLS for Data Bases

DBLS stands for Data Base Lookup System. A super-fast system for searching for a selected record in a sequential disk file. Supplied with SPELL 'N FIX's 20,000 word dictionary as a sample data file — lets you look up the spelling of any word in under FOUR seconds. Priced at \$29.95. Requires STAR-DOS.

### CHECK 'N TAX

Home accounting package combines checkbook maintenance and income tax data collection. Written in Basic for either RS Disk or Flex, \$50.

### REMOTERM

REMOTERM — makes your CoCo into a host computer, operated from a remote terminal. \$19.95.

### NEWTALK

NEWTALK — a memory examine utility for machine language programmers which reads out memory contents through the TV set speaker. \$20.

### SHRINK

SHRINK — our version of Eliza, in machine language and extremely fast. \$15.

### EDUCATIONAL SOFTWARE

Introduction to Numerical Methods — college level course on computer math, \$75.00.

We accept cash, check, COD, Visa, or Master Card. NY State residents please add appropriate sales tax.

P.O. BOX 209 — R  
MT. KISCO, N.Y. 10549  
(914) 241-0287

# PHOTOfest

A Brief Pictorial of RAINBOWfest



Had a wonderful time. Wish you were there. Fact is, several thousand of us were at RAINBOWfest and, by all accounts, it was a huge success. From Don Inman's insightful breakfast address to the informative seminars by Fred Scerbo, Dr. Hal Snyder, Charlie Roslund, E. R. Bailey, Lonnie Falk, Tom Nelson and Steve Bjork, to all the activities in the crowded Mayoral Ballroom exhibit hall, CoCo's very first show was a time to learn, a time to explore and, perhaps most of all, a time to meet people. When will the next one be, and where? Stay tuned. We don't think we can wait a year.











# Whatzit? Itz A Scrambled Word Game

By Randall Smith

*Whatzit* is a one or two player scrambled word game using *PMODE 3* to generate the screen format and character set. The game requires 16K and Extended BASIC. I'm sorry to say that it doesn't seem to want to run in a 16K machine with the disk drive attached.

The game, as written, is geared toward the older child or adult. The word list can be easily changed to fit any age group. One thing I've noticed in writing this game is the need to choose your list carefully, so as to reduce the number of words that consist of letters that would form a different word, when rearranged, to a minimum; e.g. BAT-TAB, KEEP-PEEK. I tried to use a word list that kept this problem to a minimum, but I don't think it's possible to completely eliminate the problem. The word list contains 232 words. If you change it to a different number of words, the contents of lines 90 and 270 will have to be changed to match the number of words used.

On running the program you are greeted with options to see the directions or bypass them, and to choose the number of players. The input is error trapped throughout, and screen and sound prompts will guide you through the game.

The score given for each correct guess is a result of the formula in line 630 and is a function of both the time required and length of the word. You are given approximately 30 seconds to enter the correct answer. If you mistype a letter the entry can be erased and started over by pressing the left arrow key. If you fail to guess the word the correct response will be displayed at the expiration of time.

Enough about the playing directions; they're well-documented in the internal documentation. Let's take a look at some of the logic of the program:

**LINES**

- 10-140 Sets up title screen, initializes variables
- 150-260 Sets up the graphic screen
- 270-370 Chooses word and scrambles it
- 380 Determines placement of word on the screen
- 390-420 Puts scrambled word on the screen
- 430-490 Timing loop for answer
- 500-550 Erases scrambled word and displays correct answer

- 560-570 Sets up placement of keyboard entry on screen
- 580-620 Reads and error traps keyboard entries, displays it on the screen
- 630-650 Calculates score and gets the next word
- 660-750 Displays end of game message
- 760-820 Updates and displays scores after each word
- 830-880 Word list
- 890-1240 Data for font set
- 1250-1320 Directions for playing game

The use of an incrementing scale value in the *DRAW* command, when displaying the scrambled word, results in the letters appearing to grow on the screen. Because of the varying lengths of the words, the beginning point for each word had to be figured to keep them centered. This was accomplished by the formula in line 560. The algorithm to scramble the word is in lines 280-340. Each word is checked in line 340 to be sure it is scrambled.

The font set used to generate the characters in the game is of my own design and is made with a 5 x 7 matrix. I tried to make it resemble the screen character set as much as possible. The font set can be utilized in your own programs by deleting all the lines in this program except lines 890-1240. These lines can then be saved to tape or disk and loaded back in memory before you begin writing the program. The size of the characters can be controlled by use of the scale factor in the *DRAW* command.

Clearing the screen of the previous entries was done by using the *PAINT* command to fill in the box at the bottom of the screen with the background color. This method works well if you are clearing out an area completely enclosed by the same color. To clear out the center of the screen it was necessary to use the *LINE*, *BF* command with the background color. These methods are both utilized in line 640.

I feel the program is quite flexible for different situations. By customizing the word list it can be made suitable for all age groups or for special occasions like bridal or baby showers or to challenge people in different vocabulary areas; such as specialized technical field words, states, countries—well, you get the idea. We've played with it for over a year and I hope you get as much enjoyment out of it as we have. If you get a score of 8000 or greater you've done *real* well. So, get those thinking caps on and let's play *Whatzit!*

---

(Mr. Smith is a supervisor at a state training center for retarded citizens. He is an avid "CoCo Hacker" and is also pursuing a degree in computer technology.)



The listing:

|               |               |
|---------------|---------------|
| 130..... 0271 | 830.... 0EC7  |
| 240..... 04BF | 870..... 12A2 |
| 410..... 074B | 960..... 1513 |
| 590..... 097F | 1110 ... 1754 |
| 680.... 0BAA  | 1250 .. 1A0C  |
|               | END ...1D00   |

```
10 '***WHATZIT A WORD GAME***
20 '***BY RANDALL A. SMITH***
30 'IF YOU CHANGE OR ADD TO THE
40 'WORD LIST, YOU WILL HAVE TO
50 'DETERMINE HOW MANY WORDS YOU
60 'HAVE AND ADJUST THE COUNT IN
70 'LINES 90 & 270 ACCORDINGLY
80 CLS: SOUND200, 1: PCLEAR4: PMODE3
, 1: PCLSRND(4): SCREEN1, RND(2)-1: C
LEAR350: DIM CH$(35), U(10), B(12),
SC$(2): T=RND(-TIMER)
90 FOR X=1 TO 232: READ X$: NEXT: F
OR X=0 TO 35: READ CH$(X): NEXT: RE
STORE
100 SOUND200, 2: FORX=1024 TO 1055
: POKEX, 134: NEXT: FORX=1056 TO 147
2 STEP32: POKEX, 134: POKEX+31, 134:
NEXT: FORX=1504 TO 1535: POKEX, 134
: NEXT
110 PRINT@225, "DO YOU WANT INSTR
UCTIONS(Y/N)?";
115 PRINT@170, "w h a t z i t";
120 IN$=INKEY$: IF IN$="Y" THEN GO
SUB1250 ELSE IF IN$="" THEN 120
130 PRINT@225, " HOW MANY PLAYER
S (1 OR 2)? ";
140 PL$=INKEY$: IF PL$<>"1" AND P
L$<>"2" THEN 140 ELSE PL=VAL(PL$
): SOUND200, 1
150 PCLS: DRAW"BM0, 12; C8; S8"+CH$(
30)+CH$(25): GET(0,0)-(28, 14), U, G
: GET(128, 96)-(156, 110), B
160 PCLS: DRAW"BM83, 12; S8; C7"+CH$(
32)+CH$(17)+CH$(10)
170 DRAW CH$(29)+CH$(35)+CH$(18)
+CH$(29)
180 DRAW"BM0, 30"+CH$(25)+CH$(21)
+CH$(10)
190 DRAW CH$(34)+CH$(14)+CH$(27)
+CH$(1)
200 DRAW"BM0, 48"+CH$(28)+CH$(12)
+CH$(24)+CH$(27)+CH$(14): COLOR8,
5: LINE(69, 33)-(126, 51), PSET, B
210 IF PL=1 THEN 240 ELSE COLOR7
, 5: DRAW"BM163, 30"+CH$(25)+CH$(21
)+CH$(10)
220 DRAW CH$(34)+CH$(14)+CH$(27)
+CH$(2)
230 DRAW"BM191, 48"+CH$(28)+CH$(1
2)+CH$(24)+CH$(27)+CH$(14): COLOR
8, 5: LINE(128, 33)-(185, 51), PSET, B
240 LINE(52, 171)-(200, 190), PSET,
B
```

```
250 IF PL=2 THEN LP=2: PL=PL-1
260 PUT(0, 52)-(28, 66), U, PSET: SCR
EEN1, 1
270 FOR WORD=1 TO 10: FOR X=1 TO
RND(232): READ W$: NEXT X: RESTORE
280 L=LEN(W$)
290 W(1)=RND(L-1)+1
300 FOR X=2 TO L
310 W(X)=RND(L)
320 FOR XX=1 TO X-1: IF W(XX)=W(X
) THEN 310 ELSE NEXT XX: NEXT X
330 FOR X=1 TO L: W$(W(X))=MID$(W
$, X, 1): NEXT X
340 J$="": FOR X=1 TO L: J$=J$+W$(
X): NEXT X: IF J$=W$ THEN 290
350 DRAW"BM65, 187; C6; S8"+CH$(17)
+CH$(18)+CH$(29)
360 DRAW"BM+10, +0"+CH$(14)+CH$(2
3)+CH$(29)+CH$(14)+CH$(27)
370 IF INKEY$<>CHR$(13) THEN 370
ELSE PAINT(128, 175), 5, 8
380 L=LEN(J$): M=INT(132-(21*(LEN
(J$)/2))-21)
390 FOR X=1 TO L: M=M+21: FOR S=1
TO 10 STEP 3
400 DRAW"BM"+STR$(M)+" , 100; C6; S"
+STR$(S)+CH$(ASC(MID$(J$, X, 1))-5
5)
410 PLAY"V31; T230; L230; 03; A": DR
W"BM"+STR$(M)+" , 100; C5; S"+STR$(S
)+CH$(ASC(MID$(J$, X, 1))-55)
```



by  
WILLIAMS®

You've played "DEFENDER" at the arcade, but you've only seen the "attempted copies" for your Color Computer! Now get the real thing!

Stunning sounds and explosions good enough to be approved by Williams Electronics (Makers of "DEFENDER").

Order now by check, M.O., C.O.D., or see your dealer... (If he doesn't have it yet, send him to us!)

\$27.95 — Tape

\$29.95 — Disk

Add \$1.50 per order for postage and handling.  
California residents add 6%.

QUASAR ANIMATIONS  
1520 Pacific Beach Drive  
San Diego, CA 92109  
(619) 274-2202

WILLIAMS is a registered trademark of Williams Electronics.

```

420 NEXT S: DRAW "BM"+STR$(M)+" , 10
0;C6;S12"+CH$(ASC(MID$(J$,X,1))-
55):NEXT X
430 T=2000
440 GOSUB560
450 T=T-1:IF T=0 THEN GOSUB470:G
OTO650
460 GOTO580
470 PLAY"T3;L3;V31;01;B;L2;A"
480 PAINT(128,175),5,8
490 IF T>0 THEN GOSUB560:RETURN
500 LINE(0,79)-(255,100),PRESET,
BF
510 M=INT(132-(21*(LEN(J$)/2))-2
1)
520 FOR X=1 TO LEN(W$):M=M+21
530 DRAW"BM"+STR$(M)+" , 100;C8;S1
2"+CH$(ASC(MID$(W$,X,2))-55):NEX
T X
540 FOR X=1 TO 1000:NEXT:LINE(0,
79)-(255,100),PRESET,BF
550 RETURN
560 WW$="":M=INT(130-(14*LEN(W$)
/2))
570 DRAW"BM"+STR$(M)+" , 187;C6;S8
":RETURN
580 IN$=INKEY$:IF IN$=""THEN GO
TO450
590 IF ASC(IN$)=8 THEN WW$="":GO
TO 610 ELSE IF ASC(IN$)=13 THEN

```

```

620 ELSE IF ASC(IN$)<65 OR ASC(I
N$)>90 THEN GOTO450
600 IF LEN(WW$)=LEN(W$) THEN 450
ELSE DRAW CH$(ASC(IN$)-55):WW$=
WW$+IN$:GOTO450
610 PAINT(128,175),5,8:GOSUB560:
GOTO450
620 IF WW$=W$ THEN PLAY"V31;L10;
T100;03;A;B;C;D;E;F;G" ELSE GOSU
B470:IF T>0 THEN 450 ELSE GOTO65
0
630 SC$(PL)=STR$((INT((LEN(W$)*3
0)+T/2.86))+VAL(SC$(PL))):GOSUB7
60
640 FOR X=1 TO 500:NEXT:LINE(0,7
9)-(255,100),PRESET,BF:PAINT(128
,175),5,8
650 NEXT WORD:IF LP=2 THEN PL=PL
+1:LP=0:PUT(0,52)-(28,66),B:PUT(
227,52)-(255,66),U,PSET:PLAY"T3;
L3;03;V31;6;L3;02;G":GOTO270
660 IF PL=2 THEN PUT(227,52)-(25
5,66),B ELSE PUT(0,52)-(28,66),B
670 DRAW"BM13,100;C7;S16"+CH$(16
)+CH$(10)+CH$(22)+CH$(14)
680 DRAW"BM145,100"+CH$(24)+CH$(
31)+CH$(14)+CH$(27)
690 DRAW"BM65,187;C6;S8"+CH$(17)
+CH$(18)+CH$(29)
700 DRAW"BM+10,+0"+CH$(14)+CH$(2
3)+CH$(29)+CH$(14)+CH$(27)
710 IF VAL(SC$(1))>VAL(SC$(2)) T
HEN DRAW"BM107,25" ELSE DRAW"BM1
49,25"
720 DRAW"S4;C8;NU5;NE5;NR5;NF5;N
D5;NG5;NL5;NH5":FOR X=1 TO 100:N
EXT
730 DRAW"C5;NU5;NE5;NR5;NF5;ND5;
NG5;NL5;NH5":FOR X=1TO100:NEXT
740 IF INKEY$<>CHR$(13) THEN 720
750 SC$(1)="0":SC$(2)="0":SCREEN
0,0:GOTO130
760 L=LEN(SC$(PL))-1:ON PL GOTO7
70,780
770 PAINT(98,36),5,8:M=INT(101-(
14*L/2)-14):GOTO790
780 PAINT(158,36),5,8:M=INT(160-
(14*L/2)-14)
790 FOR SC=2 TO L+1:M=M+14:DRAW"
BM"+STR$(M)+" , 48;C6;S8"
800 DRAW CH$(ASC(MID$(SC$(PL),SC
,1))-48)
810 NEXT SC
820 RETURN
830 DATA SIRLOIN,HELP,ASSIST,DON
E,REMEMBER,WORK,LADY,NAME,PROGRA
M,NUMBER,CIGAR,GRAPH,DISH,MOTOR,
ENGINE,BODY,AUTOMOBILE,TRUCK,SWE
EP,LAMP,LIGHT,DISPLAY,RECIPE,AUT
OMATIC,FEATURE,ADVENTURE,CONTEST

```



COMPUTER PROGRAMS  
 TRS-80 MODEL 1/3 16K LEVEL II  
 TRS-80 16K COLOR

-----  
 \$3 FROG RACE \$3  
 DEMO PROGRAM FROG RACE COMES ON CASSETTE WITH A  
 REFUND COUPON TO USE ON YOUR NEXT ORDER.  
 FROG RACE CASSETTE \$3. WITH CATALOG  
 -----

DUO-PAKS ARE \$10 EACH.

| PAK NO.     | PROGRAM SIDE 1  | PROGRAM SIDE 2  |
|-------------|-----------------|-----------------|
| DUO-PAK-1   | GONE FISHING    | CONCENTRATION   |
| DUO-PAK-2   | CRAPS           | SLOT-MACHINE    |
| DUO-PAK-3   | STARSHIP        | SHERLOCK HOLMES |
| DUO-PAK-4   | TANK ATTACK     | ASSOCIATION     |
| DUO-PAK-5   | NUMBER GUESS    | DICE ROLL       |
| DUO-PAK-6   | IN-BETWEEN      | SHELL GAME      |
| DUO-PAK-7   | SAFARI          | STARSHIP-2      |
| DUO-PAK-8   | MORTAR BATTLE   | PUZZLE          |
| DUO-PAK-9   | TEASERS         | MOUSE           |
| DUO-PAK-10  | PT BOAT         | TURTLE RACE     |
| DUO-PAK-11  | CHEK-CHES       | STARSHIP-3      |
| DUO-PAK-12  | THINK           | LUCK & LOGIC    |
| DUO-PAK-13  | TREASURE ISLAND | RESCUE          |
| DUO-PAK-300 | DC-OHMS LAW     | FLC-FRC         |
| DUO-PAK-501 | IC-TIMER-1      | IC-TIMER 2      |

\*\*\*\*\*  
 SYSTEM PROGRAMS \$10 EACH

SU1 CASSETTE COPY / CASSETTE COPY  
 \*\*\*\*\*  
 ORDERS WILL BE SENT BY FIRST CLASS MAIL PPD.  
 SORRY NO COD'S  
 BE SURE TO SPECIFY WHICH COMPUTER YOU HAVE.  
 B. ERICKSON P.O. BOX 11099  
 CHICAGO, IL. 60611



, MEMORY, QUICK, MACHINE, ANNUAL, HUNDRED, THOUSAND, SUGAR, BECAUSE  
 840 DATA BOOK, PAPER, AUTHOR, COAL, FUEL, STOVE, BUCKET, PAIL, LAZY, QUIT, CHURCH, CHAPEL, STAR, SHIP, COMET, PLANET, ROCK, ROCKET, INDEX, EQUAL, EVEN, SAIL, SHELL, OYSTER, LOBSTER, PLEASE, RELEASE, EDITOR, WRITE, POWERFUL, SCREEN, ALLOW, SAMPLE, THROUGH, MANY, PURSUE, EACH, COPY, BOMB  
 850 DATA FACE, NOSE, CHEEK, BONE, FAT, MUSIC, TELEVISION, RADIO, LAW, SENIOR, JUNIOR, FRESH, SCHOOL, LIFT, RAISE, LOWER, MEDIUM, PLAIN, HILL, FARMER, RANCH, WING, SOME, OTHER, BELIEVE, THIS, JUST, WILD, MOTHER, FATHER, UNCLE, AUNT, SHOCK, EXACT, GENEROUS, BROWN, BLUE, GREEN, PURPLE, EIGHT  
 860 DATA INDIAN, STATE, COUNTRY, THAT, POLICE, PECAN, WALNUT, BROOM, SAGE, PEPPER, MALT, DRUG, STAMP, ENVELOPE, HEAT, CLEAN, DIRTY, CARPET, SOFA, COUCH, TABLE, FLOWER, SHACK, LOOK, SHOE, PANTS, DRESS, SHIRT, SOCK, MITTEN, GLOVE, STRANGE, CITY, TOWN, BRIGHT, BEAUTIFUL, NOVEL, SWING, FORM  
 870 DATA CABINET, DRIFT, FLOAT, PRETEND, AUDIO, DOCTOR, DENTIST, NURSE, RENT, LEASE, SKILLET, BROIL, BAKE, FR

Y, HAMMER, MOVE, CHICKEN, DUCK, GOOSE, HORSE, PONY, COLT, KNIGHT, RIDE, PAN, POT, MORTGAGE, PRETEND, PLAY, TENT, KNOW, TEACH, DRINK, DARK, VOICE, HOTEL, MOTEL, INTIMATE, STORY, ST  
 880 DATA SIZE, CENTER, FORWARD, GUARD, TACKLE, GOAL, BACK, GROUND, PRESENT, GIFT, LOCKER, CIRCLE, FLOWER, CRYSTAL, JEWEL, COFFEE, FLEA, CRIME, MURDER, HOLD, UGLY, PRETTY, MILD, GENTLE, HAMMER, BALL, THEIR, THEY, WERE, GIRL, WARM, SOFT, YIELD, CREATURE, FAST, SLOW, EVERYONE, SUCH, END  
 890 DATA "BU1;U4;E1;R2;F1;D4;G1;L2;H1;BD1;M+4,-6;BD6;BR3"  
 900 DATA "BU5;BR1;E1;D6;NL1;R1;BM+4,+0"  
 910 DATA "NR4;U1;BU3;U1;E1;R2;F1;D1;G1;L1;G2;BM+7,+1"  
 920 DATA "BU5;E1;R2;F1;D1;G1;NL2;F1;D1;G1;L2;NH1;BM+7,+0"  
 930 DATA "BU3;NR4;M+3,-3;D6;BM+4,+0"  
 940 DATA "BU4;NR3;U2;R4;BD2;BL1;F1;D2;G1;L2;H1;BM+7,+1"  
 950 DATA "BU6;BR3;NF1;L2;G1;D2;NR3;D2;F1;R2;E1;U1;H1;BM+4,+3"  
 960 DATA "U1;BU5;R4;D1;M-4,+4;BM+7,+1"



## CIRCLE CITY SOFTWARE

P.O. Box 30166  
 Indianapolis, Indiana 46220



Credit Card Customers include number and expiration date.



### NEW MASTER DISK

\$29.95

A touch of a button allows you to keep tabs on your disk library. Creates directory files directly from 100 of your source disks on one Master Disk. Search by file name, file type, disk name, free space, or individual directory. All output can be sent to line printer. Menu driven and very user friendly! This is an improved version of the program reviewed in The Rainbow. Optional accessory package adds even more features. 16K or 32K disk required.

### ACCESSORY PACKAGE

\$20.00

A second disk for improved versions of the original single-disk accessory programs. Includes notebook for storage of disks and paperwork.

#### \*SORT\*

New Sort program is faster and more efficient than original version. Runs in 16 or 32K to produce an alphabetic listing of all file types you specify.

#### \*RECOVER\*

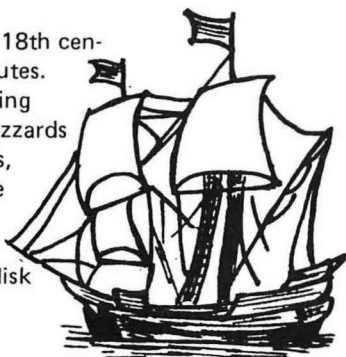
New Recover program not only rewrites directories from master files but can rebuild an entire disk to eliminate "IO" errors.

#### \*ZAP\*

New addition. User friendly directory Zapper to manually correct directory data when all else fails. Menu-driven with help files for novices.

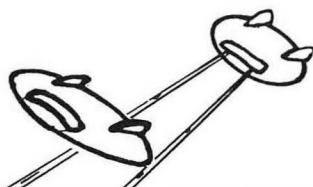
### SEA TRADER

A new game in which you play an 18th century sea captain plying the trade routes. The you start out on a shoestring and try to become a billionaire. Hazzards include pirates, storms, bad markets, and bad debts. People have become so fascinated with this game that they actually cheat to keep from winning. 16K color basic, tape or disk \$19.95.



### COLOR STAR PILOT

Take a trek through space to defeat the alien enemy in this superior version of a classic space game! Reviewed in Rainbow. Requires extended basic. Comes with 32K 3-level game or 16K novice version. Tape or disk \$19.95.



970 DATA "BU1;U1;E1;R2;E1;U1;H1;  
L2;G1;D1;F1;R2;F1;D1;G1;L2;H1;BM  
+7,+1"  
980 DATA "BU1;F1;R2;E1;U4;H1;L2;  
G1;D1;F1;R3;BM+3,+3"  
990 DATA "U5;E1;R2;F1;D3;NL4;D2;  
BR3"  
1000 DATA "U6;R3;F1;D1;G1;NL3;F1  
;D1;G1;L3;BR7"  
1010 DATA "BU1;U4;E1;R2;F1;BD4;G  
1;L2;H1;BR7;BD1"  
1020 DATA "R1;U6;NL1;R2;F1;D4;G1  
;L2;BR6"  
1030 DATA "U3;NR3;U3;R4;BD6;L4;B  
R7"  
1040 DATA "U3;NR3;U3;R4;BD6;BR3"  
1050 DATA "BU1;U4;E1;R3;BD4;NL1;  
D2;L3;H1;BR7;BD1"  
1060 DATA "U3;NR4;U3;BR4;D6;BR3"  
1070 DATA "BU6;BR1;R1;ND6;R1;BR1  
;BD6;BL1;L2;BR6"  
1080 DATA "BU2;D1;F1;R2;E1;U5;BD  
6;BR3"  
1090 DATA "U6;BR4;M-4,+3;M+4,+3;  
BR3"  
1100 DATA "NU6;R4;BR3"  
1110 DATA "U6;M+2,+3;M+2,-3;D6;B  
R3"

1120 DATA "U6;M+4,+6;U6;BD6;BR3"  
1130 DATA "U6;R4;D6;L4;BR7"  
1140 DATA "U6;R3;F1;D1;G1;L3;D3;  
BR7"  
1150 DATA "BU1;U4;E1;R2;F1;D4;G1  
;L2;H1;BE1;BR1;F2;BR3"  
1160 DATA "U6;R3;F1;D1;G1;L3;R1;  
M+3,+3;BR3"  
1170 DATA "BU1;F1;R2;E1;U1;BU3;H  
1;L2;G1;D1;M+4,+2;BR3;BD2"  
1180 DATA "BU6;R2;ND6;R2;BD6;BR3  
"  
1190 DATA "BU1;U5;BR4;D5;G1;L2;H  
1;BD1;BR7"  
1200 DATA "BU6;M+2,+6;M+2,-6;BD6  
;BR3"  
1210 DATA "U6;BR4;D6;M-2,-2;NU1;  
M-2,+2;BR7"  
1220 DATA "U1;M+4,-4;U1;BL4;D1;M  
+4,+4;D1;BR3"  
1230 DATA "BR2;U3;M-2,-2;U1;BR4;  
D1;M-2,+2;BD3;BR5"  
1240 DATA "BU6;R4;M-4,+6;R4;BR3"  
1250 CLS:PRINT:PRINT" IN whatz  
it A SCRAMBLED GROUPOF LETTERS  
WILL APPEAR. YOU WILLHAVE APPROX  
IMATELY THIRTY SEC- ONDS IN WHI  
CH TO FIGURE OUT THE CORRECT WOR  
D THESE LETTERS FORM AND ENTER T  
HEM ON THE KEYBOARD."  
1260 PRINT"IF YOU MAKE A TYPING  
ERROR, YOU MAY HIT THE '\_' KEY A  
ND START OVER. IF YOU <ENTER>  
THE WRONG ANSWER, IT WILL BE ER  
ASED AND YOU MAY RE-ENTER IT A  
S TIME AL-"  
1270 PRINT"LOWS. THE GAME MAY BE  
PLAYED BY EITHER ONE OR TWO PEO  
PLE.":PRINT:PRINT" HIT ANY KE  
Y TO CONTINUE";  
1280 IF INKEY\$=""THEN 1280  
1290 CLS:PRINT:PRINT" EACH PLA  
YER GETS TEN RANDOM- LY CHOSEN W  
ORDS IN EACH ROUND. YOUR SCORE  
IS BASED ON BOTH THE AMOUNT OF T  
IME YOU USE AND THE LENGTH OF T  
HE SCRAMBLED WORD."  
1300 PRINT"PLEASE NOTE THAT YOUR  
ANSWER IS NOT COMPLETE UNTIL YO  
U PRESS <ENTER>. THE TIMER DO  
ES NOT START UNTIL ALL THE S  
CRAMBLED LETTERS ARE ON THE SC  
REEN. FOL- LOW THE PROMPTS AS TH  
EY APPEAR ON THE SCREEN AND GOO  
D LUCK!!"  
1310 PRINT:PRINT" HIT ANY KEY TO  
BEGIN THE GAME"  
1320 IF INKEY\$=""THEN 1320 ELSE  
CLSRND(8):GOTO130



# UPSET

**ABOUT POOR  
VIDEO QUALITY?**

**We can fix it!**



**Designed  
by**

**Dennis B.  
Kitsz !!**

|                                        |         |
|----------------------------------------|---------|
| ASSEMBLED LOWER CASE MODULE            | \$69.95 |
| Easy to install - No software changes  |         |
| -Adds lower case with true descenders. |         |
| BOARD ONLY                             | \$12.00 |



TV Buff  
will give standard NTSC  
video output for virtually  
any monitor \$ 9.95

send \$1.00 for our  
complete catalog

dealers call (212) 499-5400

## WORLD ELECTRONICS

177 27th Street  
Brooklyn, N.Y. 11232

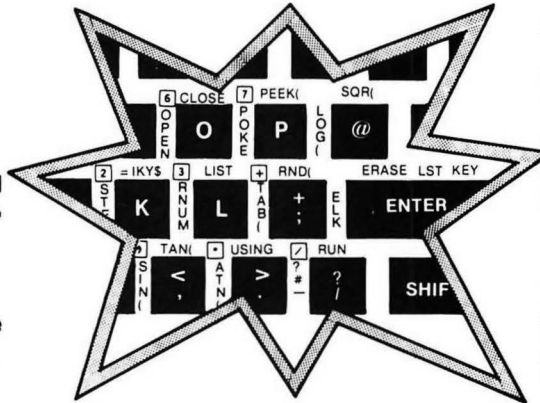


platinum  
software

# WORKSAVER RECEIVES RAVE REVIEWS

FROM COLOR COMPUTER NEWS AND RAINBOW

- Fast Entry of Basic Programs
- Over 100 user definable keys
- Enhances all Coco's from 16K Non Extended Basic to Extended, 64K, Disk
- Available on Disk or cassette
- Built in cassette merge
- User's Support Service



"There are a number of products on the Coco market...the WORKSAVER ranks up there with the best of them"  
—Rainbow Dec. '82

"...undoubtedly the best program I have ever bought for my color computer"  
—Color Computer News Jan. '83

"the main function of the program seems to be making things easier and more functional for the user. It succeeds extremely well"  
—Color Computer News Jan. '83

THE WORKSAVER WILL SAVE YOU HOURS OF WORK...WRITING AND DEBUGGING YOUR PROGRAMS"

—Rainbow Dec. '82

## FULL SCREEN EDITOR

"WANT TO CHANGE the line a couple lines up? Simple. Use the arrow keys to the appropriate place and make the change. This is not only a lot easier, but it is vastly faster, too...changing line numbers, joining lines together, breaking them apart, duplicating them elsewhere—heady stuff—is very easy to do with the Work saver" (Rainbow)

## DYNAMIC EDITING

This is one of our users' favorite features: When the computer halts due to an error, or you want to make an improvement while running, you can make changes without losing data: "This is a major plus in debugging...it can save a lot of time in data loads...(and) the generation of data through inputs." Rainbow Dec. '82

"The things that this program add to the color computer..."

## INCREASE ITS CAPABILITIES MANIFOLD

...it should have been incorporated into the original MICROSOFT programming (or) given out with every color computer."

—Color Computer News Jan '83

## THE PLATINUM WORKSAVER INCLUDES:

- Enhancement program, including a sample array editor on a high-quality Agfa cassette.
- Fully labeled acetate keyboard overlay, not a cheap stick-on.
- Complete instructions
- Loads in seconds, takes 2.2 K

## WORKSAVER A1-A3 OWNERS:

Contact us regarding return policy for our New A-4 version.

The PLATINUM WORKSAVER costs \$35.00 plus \$3.00 S&H (NY residents add appropriate tax). To order write:

PLATINUM SOFTWARE  
P.O. Box 833  
Plattsburgh, N.Y. 12901

Phone orders: (518) 643-2650 9-5 EST

VISA, MASTERCARD ACCEPTED. PERSONAL CHECKS TAKE 2-3 WEEKS TO PROCESS.



## DYNAMIC INPUT

Perform numeric calculations, and check the contents of arrays and variables, WITHOUT interrupting the running of BASIC programs: "An EXTREMELY valuable feature that I use ALL the time."

—Color Computer News Jan. '83

## NUMERIC KEYPAD CONVERSION

"The keys JKLUIOP are defined as the numbers 1-7, respectively...this mode is a Godsend for long data statements."

—Color Computer News Jan. '83

## FULL FEATURED 4 COLOR KEYBOARD OVERLAY

"TRUTH: The WORKSAVER overlay is the best we have seen for this type of program."

—The Rainbow Dec. '82

"A well designed keyboard overlay (NOT a sticker..."

—Color Computer News Jan.

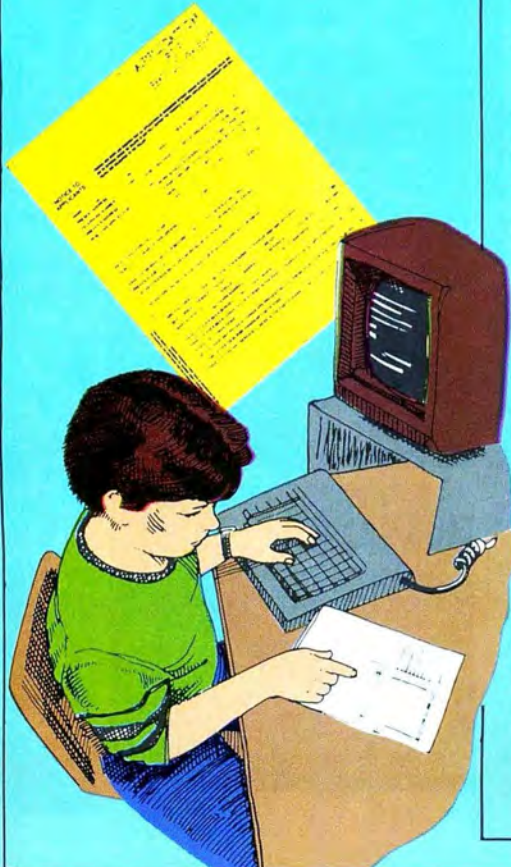
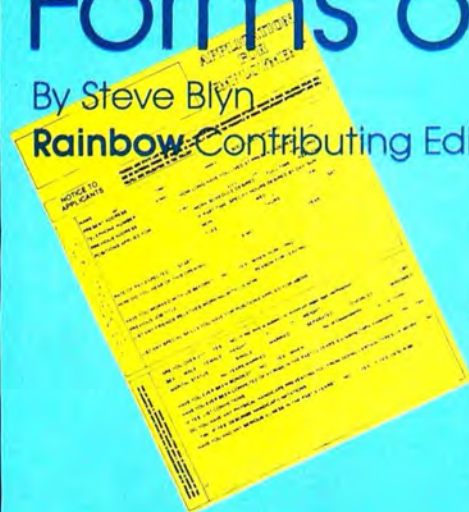
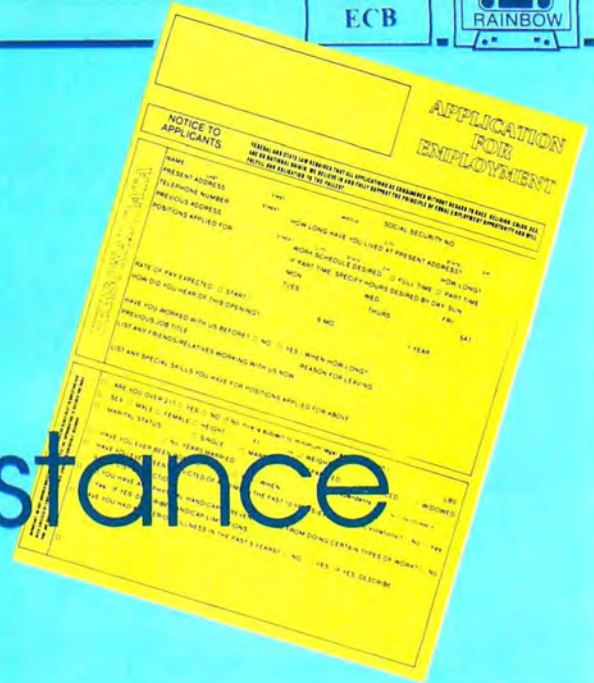
'83

UPGRADE YOUR COLOR COMPUTER



# Learning To Create Forms of Substance

By Steve Blyn  
Rainbow Contributing Editor



**W**hen was the last time you filled out a form? I sometimes feel that I am constantly asked to fill out a form of one kind or another.

A surprising number of students are unable to independently complete many forms and applications. In a world full of forms, it is essential to have the ability to fill them out properly. Too often, mistakes are made by handlers of these forms even after we have completed them correctly. Let's at least learn to do our part right.

We have all had experiences filling out charge, employment, school, social security, motor vehicle, bank account, health insurance, and innumerable other forms and applications. Yet, this is not a subject often taught in our schools. It really should be taught as part of a "survival education" or "life preparation" course. Too frequently, children encounter these legalistic looking papers for the first time when they actually have to fill them out for a real purpose.

This month's program offers practice and some teaching of a few of the common elements of applications. It is by no means a comprehensive course in filling out forms. It is merely a start on this path.

You may be surprised to find which items confuse certain children. I am constantly surprised by this. My own 10 year old was totally baffled on whether his borough or city should go into the "city" space. (The borough is usually the expected correct response in New York City.) Many children who are well aware of the answer are confused about exactly how they should enter their date of birth. Don't be surprised when unusual answers occur. A common answer to the questions of



"sex" for many children is "yes" or "no" rather than "male" or "female." This is the time and place for the kids to learn the correct responses.

Much effort went into anticipating the various possible mistakes that children may make on the individual items. For example, line 250 will automatically insert a comma after the name of the city. Lines 310 and 340 will similarly place parentheses around the area code in a telephone number.

Some items on applications have variable lengths. As much room as possible was left to accommodate names of persons and cities. Other items, however, have definite lengths. This program coaxes the child to use only the correct number of entries. For example, the U.S. Post Office has two letter abbreviations for all of the 50 states. No periods are used anymore. Line 260 checks to see if two letters were used for the state's entry. If other than two letters are used, the program goes to line 520 where the message "all states use two letters" is flashed. Then the child is always given another chance to enter the item correctly. Area codes, zip codes, and telephone numbers have similar error trapping and messages. Of course, if you live in an area that has different rules, then change the values in the appropriate places to reflect your needs.

Most applications expect two digit answers for data of birth questions. February 20, 1960, usually appears as 02/20/60. This program reinforces the use of two digits and checks on lines 430 and 450 for improper month or date

*(Mr. Blyn, who teaches both exceptional and gifted children, holds two Master's degrees in the field of education and has won an award for the design of a computer program to aid handicapped children. He and his wife, Cheryl, own Computer Island.)*

entries. Line 630 prints the error message for these responses.

After the last entry is completed, the message "your application is accepted" is scrolled across the bottom of the screen. Other possible items that you may wish to include in an enlarged version are sex, date, height, weight, hair and eye color, references, etc.

We welcome your comments as well as the opinion of any youngsters who make use of this program. Let's hear from you.

The listing:

|              |               |
|--------------|---------------|
| 120.....01B9 | 430..... 0590 |
| 260.....036C | 560..... 0858 |
|              | END .. 0AC7   |

```

10 REM*STEVE BLYN,COMPUTER ISLAN
D
20 CLEAR500
30 CLS:PRINT@96,"DO YOU HAVE A P
RINTER TURNED ON":INPUT PR$:IF L
EFT$(PR$,1)="Y" THEN PR=1
40 POKE359,57:SCREEN0,1: REM****
*LET'S USE A DIFFERENT COLORED
SCREEN FOR A WELCOME CHANGE
50 CLS
60 PRINT@6,"*application form*";
70 PRINT@32,"NAME:";
80 PRINT@69,"-----"
-----";
90 PRINT@102,"LAST FI
RST";
100 PRINT@37,"";:LINE INPUTL$:SO

```



# Spellbinding?

Of Course! And Educational Too!

"Hello, I'm Merlapple™ the Wizard. My friends and I from Follett Library Book Company are helping grade school children all over the United States build logic, math and language skills through six unique programs designed for the Radio Shack TRS-80 Color Computer.

These widely acclaimed, award winning games from The Learning Company capture the fancy and test the reasoning processes of boys and girls ages preschool through thirteen. Using both high and low resolution graphics, the games range from easy to "mind-boggling", each offering a distinct challenge to its players. "How-to-play" enactments contribute to program understanding, while both graphic and musical feedback enhance learning.

The six outstanding programs offered include Juggles Rainbow™, Bumble Plot™, Bumble Games™, Magic Spells™, and Moptown Hotel™. To order any or all of the above programs, please return the order form below.

PRICES SUBJECT TO CHANGE

## SOFTWARE ORDER FORM

Date \_\_\_\_\_

| RADIO SHACK COLOR COMPUTER (16K EXTENDED BASIC) |              |       |          |              |       |          |
|-------------------------------------------------|--------------|-------|----------|--------------|-------|----------|
| PROGRAM TITLE                                   | CASSETTES    |       |          | DISKETTES    |       |          |
|                                                 | ORDER NUMBER | PRICE | QUANTITY | ORDER NUMBER | PRICE | QUANTITY |
| Juggle's Rainbow                                | 90202C       | \$37  |          | 90202D       | \$50  |          |
| Bumble Games                                    | 90200C       | \$45  |          | 90200D       | \$65  |          |
| Bumble Plot                                     | 90201C       | \$45  |          | 90201D       | \$65  |          |
| Magic Spells                                    | 90203C       | \$40  |          | 90203D       | \$55  |          |
| Moptown Hotel<br>(3 programs)                   | 90204C       | \$30  |          | 90204D       | \$35  |          |
| Moptown Parade<br>(8 programs)                  | 90205C       | \$40  |          | 90205D       | \$45  |          |
|                                                 | TOTAL        |       |          | TOTAL        |       |          |

Name \_\_\_\_\_

School/Library \_\_\_\_\_ Dist. # \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Phone No. of Person Originating Order \_\_\_\_\_

Your FLB Acct. # \_\_\_\_\_ P.O. # \_\_\_\_\_

CHECK ENCLOSED      EXP. DATE \_\_\_\_\_

CHARGE CARD # \_\_\_\_\_



**FOLLETT LIBRARY BOOK CO.**  
 4506 Northwest Highway, Crystal Lake, IL 60014  
**TOLL-FREE 800-435-6170**  
 In Illinois, Hawaii, Alaska call collect: 815-455-1100



```

UND170,3
110 PRINT@52," ":PRINT@52,"";:LINE
INPUTF$:SOUND200,3
120 PRINT@64," ":PRINT@96," ":'*
**REMOVES LAST AND FIRST
130 PRINT@96,"ADDRESS:";
140 PRINT@136,"-----
-----";
150 PRINT@169,"STREET AND NUMBER
";
160 PRINT@104,"";:LINEINPUTS$:SO
UND100,3
170 IF LEN(S$)>24 THEN PRINT@104
,LEFT$(S$,24)+" "
180 PRINT@132," ":PRINT@160," "
190 GOSUB200:GOTO210
200 PRINT@160,"-----
-----";:RETURN
210 PRINTTAB(10)"CITY"TAB(22)"ST
ATE"TAB(28)"ZIP"
220 PRINT@128,"";:LINEINPUTC$:SO
UND125,3
230 CC=LEN(C$):IF CC>22 THEN PRI
NT@128," ":PRINT@128,LEFT$(C$,22
)
240 IFCC>22 THEN CC=22
250 PRINT@128+CC,",";
260 PRINT@152,"";:LINEINPUTST$:I
F LEN(ST$)<>2 THEN GOTO 520

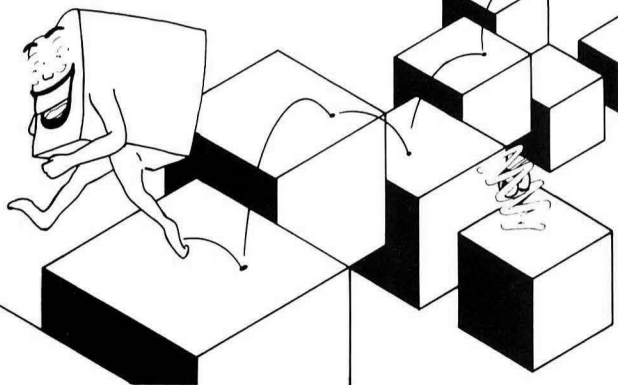
```

```

270 SOUND 150,3
280 PRINT@155,"";:LINEINPUT Z$:
IF LEN(Z$)<>5 THEN GOTO 530
290 SOUND 180,3
300 PRINT@160," ":PRINT@192," "
310 PRINT@192,"TELEPHONE #:()
"
320 PRINT@236,"----- -----";
330 PRINT@205,"";:LINEINPUTT$:IF
LEN(T$)<>3 THEN 540
340 PRINT@208,")";
350 PRINT@210," ":PRINT@210,"";:
LINE INPUT TT$:IFLEN(TT$)<>8 THE
N 550
360 IF MID$(TT$,4,1)<>"-"THEN 55
0
370 PRINT@224," ":PRINT@256,"AGE
";:PRINT@292,"--";
380 PRINT@260," ":PRINT@260,"";:
LINEINPUTAG$
390 IF VAL(AG$)<1 OR VAL(AG$)>99
THEN GOTO 560
400 PRINT@264,"DATE OF BIRTH:";:
PRINT@310,"-- -- --";
410 PRINT@342,"MO.DA.YR.";
420 NN=12:PRINT@278," ":PRINT@27
8,"";:LINEINPUTMO$:IFLEN(MO$)<>2
THEN GOTO 570
430 IF VAL(MO$)<0 OR VAL(MO$)>12
THEN GOTO 580
440 NN=31:PRINT@281," ":PRINT@28
1,"";:LINEINPUTDA$:IFLEN(DA$)<>2
THEN GOTO 590
450 IFVAL(DA$)<0 OR VAL(DA$)>31
THEN GOTO 600
460 PRINT@284," ":PRINT@284,"";:
LINEINPUTYR$:IFLEN(YR$)<>2 THENG
OTO 610
470 PRINT@288," "
480 AP$="your application is acc
epted"
490 FORT=1T029:PRINT@447-T,LEFT$
(AP$,T):SOUND230,1:NEXTT
500 IF PR=1THEN 640 ELSE 710
510 '*
520 FORT=1T03:PRINT@420,"ALL STA
TES USE 2 LETTERS";:SOUND40,8:NE
XTT:PRINT@152," ":PRINT@416," ":
GOSUB200:GOTO260
530 FORT=1T03:PRINT@416,"ALL ZIP
CODES HAVE 5 DIGITS.":SOUND70,8
:PRINT@155," "":NEXTT:PR
INT@416," ":GOSUB200:GOTO280
540 FORT=1T03:PRINT@416,"AREA CO
DES HAVE 3 DIGITS.":SOUND70,8:NE
XTT:PRINT@416," ":GOTO310
550 FORT=1T03:PRINT@416," TELEPH
ONE #'S HAVE 7 DIGITS WITH A
DASH AFTER THE FIRST 3.":SOUND70
,8:NEXTT:PRINT@416," ":PRINT@448

```

## BLOC HEAD



The pyramids of brightly colored cubes would be a simple challenge for your little Bloc Head - IF it weren't for the dispicable characters after him, who try to push him off the cubes before he can change their colored surfaces! Bloc Head must dodge the sinister springs, bad eggs, & other evils. Luckily the good guys give him points and two elevators help him escape to the top of the pyramid, leaving the evil pursuers behind. Bloc Head knows that if he can just clear the pyramid of cubes, he goes to the next level of play, always adding up points.

cassette \$26<sup>95</sup> disk \$29<sup>95</sup> add \$2<sup>00</sup> shipping



Box 668 • Encinitas, CA 92024

Dealer Inquiries Invited (619) 436-3512



COLOR COMPUTER/TDP-100\*

# SUPER-PRO

REPLACEMENT KEYBOARD KIT



\*Computers produced after approximately October, 1982 require an additional keyboard plug adapter—please add \$4.95.

- Affordable Price—Only \$69.95.
- A **must have** for all serious computerists.
- Highest quality—U.S. made.
- Direct replacement—same key layout
- Professional appearance and operation.
- Fast, simple installation.
- Complete instructions included.
- In stock now.

AT YOUR FAVORITE DEALER OR DIRECT FROM

# MD

Mark Data Products

24001 ALICIA PKWY., NO. 226, MISSION VIEJO, CA 92691 • (714) 768-1551

We pay shipping on all orders in the continental U.S. and Canada. Overseas add \$5.00 for shipping and handling. Foreign orders please remit U.S. funds. California residents, please add 6% sales tax. We accept MasterCard and VISA. We are always looking for quality machine language programs. Contact us for details.

## APPRAISAL & FINANCIAL SOFTWARE

### INCOME APPROACH PRINTOUT USING MORTGAGE-EQUITY CAPITALIZATION

It provides a report ready page, listing all significant details of the cap. rate construction, capitalization of the net income, rounding and comments, if any. Select any interest or yield rate, and terms within normal parameters. User friendly; just answer the questions as to rates, terms, net appreciation/depreciation, net income and out comes the Income Approach page. It takes so little time, you can do it over quickly if you wish to amend the computation. Printer required. Tapes \$85. Disk \$95.

### COMPOUND INTEREST & ANNUITY TABLES, WITH LEASEHOLD AND SUBLEASEHOLD COMPUTATION PROGRAMS

Have the big book and more for your assistance at computer speed. Computes any rate, and terms within normal parameters. This alone is worth the price. The lease program is of inestimable value. User friendly and menu driven for ease of use. Printer desirable. Tape \$85. Disk \$95.

### INVESTMENT ADVISOR PROGRAM

Provides practical usage of all six functions of compound interest: (1) What a fixed amount left at compound interest will grow to, (2) What a fixed amount deposited periodically will grow to, (3) The periodic deposit required to grow to a fixed amount by a future date, (4) What a fixed amount due in the future is worth today, (5) What a fixed periodic payment for a fixed period of time is worth today, (6) Fixed periodic payment required to repay a loan at compound interest. THESE COMPOUND FUNCTIONS ARE THE BASIC REQUIREMENTS TO COMPUTE MOST FINANCIAL PROBLEMS. Printer desirable. Tape \$85. Disk \$95.

### OTHER COMPUTER SYSTEMS

The programs are being made available for TRS 80 II & III, Apple, and IBM, PC. Ask for price.

### IN EXTENDED BASIC FOR TRS80CC & TDY100

ORDERING: Include \$3. for shipping in U.S. & Canada; others \$6.00. Add \$2.00 for C.O.D. Texas Residents add 5% for sales tax. 713/780-4566 (9 to 5 C.T.) All programs prepared by M.A.I. with over 20 years experience. WINSTEAD CO., INC., Box 31489, Houston, TX 77231

```
, " ":GOTO 350
560 FORT=1T03:PRINT@417,"THAT'S
NOT YOUR REAL AGE...":SOUND70,8:
NEXTT:PRINT@416," ":GOTO 380
570 GOSUB620:GOTO 420
580 GOSUB630:GOTO420
590 GOSUB620:GOTO440
600 GOSUB630:GOTO440
610 GOSUB620:GOTO460
620 FORT=1T03:PRINT@422,"USE 2 D
IGITS, PLEASE":SOUND70,8:NEXTT:PR
INT@416," ":RETURN
630 FORT=1T03:PRINT@417,"ONLY US
E NUMBERS FROM 1 TO";NN:SOUND200
,6:NEXTT:PRINT@416," ":RETURN
640 PRINT#-2,TAB(30)"APPLICATION
FORM":GOSUB720:GOSUB720
650 PRINT#-2,TAB(5)"NAME:"TAB(20
)L$TAB(40)F$:GOSUB 730
660 PRINT#-2,TAB(20)"LAST"TAB(40
)"FIRST":GOSUB720
670 PRINT#-2,TAB(5)"ADDRESS:"TAB
(20)S$:GOSUB730
680 PRINT#-2,TAB(20)C$,"ST$" "
Z$:GOSUB730:GOSUB720
690 PRINT#-2,TAB(5)"TELEPHONE #:"
TAB(20)"("T$)"TT$:GOSUB730:GO
SUB720
700 PRINT#-2,TAB(5)"AGE:"TAB(12)
AG$TAB(20)"DATE OF BIRTH:"MO$"/
"DA$"/"YR$:GOSUB730
710 END
720 FORT=1 TO 2:PRINT#-2," ":NEX
TT:RETURN
730 PRINT#-2,TAB(20)"-----"
:RETURN
```

## RAINBOWfest Seminar Talks Available On Tape

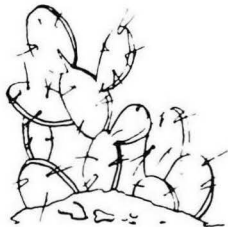
Copies of all seminars given at RAINBOWfest are now available on audio tape.

In addition, a tape is available of the keynote breakfast speech given by Don Inman. Seminars were given by Fred Scerbo of IMB on educational software; E.R. Bailey of Micrologic on faster Basic; Dr. Hal Snyder of the Northern Illinois Color Computer Club on assembly language techniques; Tom Nelson of Nelson Software on legal aspects of software marketing; Steve Bjork of Datasoft on assembly language graphics; Charles Roslund of Elite Software on machine language utilities and a cooperative session for CoCo clubs with Lonnie Falk of *the Rainbow*. Each session lasted over an hour.

Tapes are \$5 each, or all eight for \$35. There is a \$1.50 shipping and handling charge, whether you buy one or all of them.

Orders should be sent to Seminar Tapes, Prickly-Pear Software, 9234 E. 30th Street, Tucson, AZ 85710. Do not send orders directly to *the Rainbow*, it will just delay your order.





# PRICKLY-PEAR SOFTWARE

## QUALITY PROGRAMS FOR YOUR COCO & TDP-100

PROGRAMS REQUIRE 16K EXTENDED BASIC FOR TAPE, AND 32K DISK UNLESS OTHERWISE NOTED.

### ALL NEW THIS MONTH

#### Disk Zapper!!!

This great utility is unique in the Color Computer field. It gives you the ability to **format and copy disks with up to 40 tracks**, instead of the usual 35. In addition, when copying a disk it will not crash when it encounters a bad sector. Instead, it tries to read the sector five times and then continues, so you can retrieve most of the data from even a worst case disk, where the directory track is physically damaged. These features alone make this program invaluable, but it will also copy any track and sector to any other (Make a copy of your directory up on track 36 where BASIC can't get to it!!!) and allows you to display the contents of any part of the disk on the screen, where you can examine the information directly and make any changes you want using a full screen editor. Your changes are automatically made on the disk as you scan thru the sector. There are also many other applications of this powerful utility which are fully described in the extensive documentation. This is both a programmer's tool and a means to protect your expensive disk software collection by backing up your disks and your disk directories. **DISK ZAPPER!!!** requires 64K and one disk drive. Copy procedure requires two drives. **\$34.95**

#### Music Box

A 100% machine language program that lets you EASILY compose (or type in from sheet music) your favorite song in FOUR PART HARMONY, and assign a different instrument to each voice. Hear the flute on the high parts, the bass on the low, and the cello and clarinet on the others. Or, if you prefer, use one instrument for several voices. This program makes it easy to key in your songs, and they sound great!! You can play them either backward or forward when you get them done, and you can save them on tape to be loaded in later. You can easily write pieces that will run for several minutes. The program comes with a song by BACH, and when you hear it I think you will agree that this song alone is just about worth the price. You won't believe the music coming out of your TV!! The program comes with lots of instructions to help you along, and you will find yourself playing your first masterpiece in a very short time. Requires 16K with any BASIC. **Cassette - \$24.95**

#### Prickly-Pear Mailing List

We hope you waited for this mailing list program, 'cause you'll be mad at yourself if you didn't!! This program has six fields for Name, Address, City and State, Phone number, Zip code, and Code. You can sort alphabetically by last name whether you type your entries with the first name or last name first. You can sort in Zip Code order. You can search your file on any field you like. You can easily add or delete entries. You can print any entry — or all entries — or all entries meeting your search criteria. You can print a phone number list. You can print your labels either one or two across the page. And best of all, you can do all these things with up to 1500 records on a single drive system. Oh yes, all screen display is in full upper and lower case letters on your choice of a green or white background with no adaptors needed. To use this mailing list you need 32K Disk Basic and one disk drive. It comes with very complete instructions and is a truly "User Friendly" program. **\$49.95**

FOR DISK VERSIONS ON AMDEK CARTRIDGES, ADD \$5.

Your Personal check is welcome - no delay. Include \$1.50 shipping for each program ordered. (Shipping free on \$50.00 or larger orders). Az. residents add 6% sales tax. Orders shipped within two days.

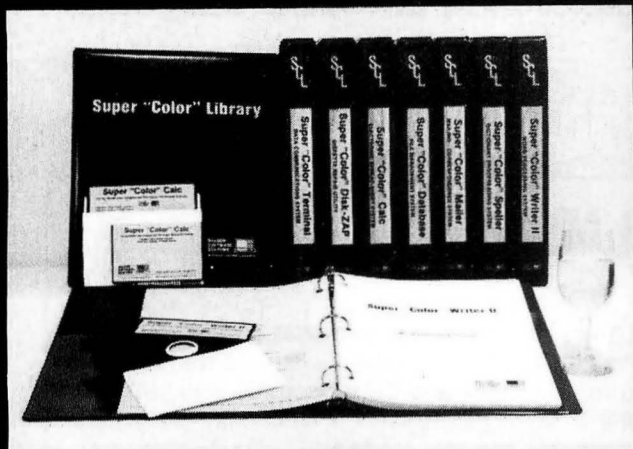
Stocked by Quality Dealers, or

Send Order To: **PRICKLY-PEAR SOFTWARE**

9234 E. 30th Street  
Tucson, Arizona 85710  
(602) 886-1505

# Super "Color" Library™

For the TRS-80 Color and TDP System 100 Personal Computers



No matter what kind of problem you are trying to solve with the Color Computer, there is a program in the ever-expanding integrated, **Super "Color" Library** that will give you the solution; Faster, Better, Smarter!

Every Library program features **MEMORY-SENSE** to determine your computer's memory, from 16 to 64K, and adjusts automatically to maximize work space. All programs, except the **Super "Color" Speller** and **Super "Color" Disk-ZAP**, feature a true lowercase display with below line descenders. Each program has been written specifically for the Color Computer in fast machine code to be totally compatible for optimum performance — Something a motley assortment of programs from diverse sources or a passel of overpriced, wallet-FLEXing software from a bygone era simply can not achieve.

The **Super "Color" Library** has all the power, speed, dependability and compatibility you will ever need so build your library a volume at a time or put the full power of the complete library of problem solvers to work right away.

— NEW! —

**64K**  
Compatible

## Super "Color" Writer II™

VERSION 3.0 By Tim Nelson  
THE INTELLIGENT WORD PROCESSOR

32x16 &  
51-64-85x21&24  
WITH REAL  
LOWERCASE  
DISPLAY

The **Super "Color" Writer II** is for those who desire the best. It is the most powerful, fastest, most dependable and versatile word processor available for the Color Computer, from 16 to 64K. The **Super "Color" Writer II** has features for the most demanding professional, yet it is easy enough for newcomers to master.

Of course the **Super "Color" Writer II** has all the features you would expect from the highest quality word processor, such as a clear, crisp and readable professional display with your choice of display colors, 9 display formats; standard 32x16 & 51-64-85x21 & 24 with real lowercase descenders; full 4-way cursor control, sophisticated edit commands, the ability to edit any BASIC program or ASCII textfile, seven delete functions, locate and change, wild card locate, a real block move & copy, word wrap-around, programmable tabs, display memory used and left, non-breakable space, multiple headers and footers, dynamic text formatting, comprehensive format parameters, use with ANY printer at any baud rate from 110 to 9600 baud, automatic justification, automatic pagination, automatic centering, automatic flush right, underlining, superscripts, subscripts, pause print, single-sheet pause, optionally print comments, append text files, available in a ROMPAK cartridge for maximum work space, but that's only half of the story. No other program can even begin to compare in features with the **Super "Color" Writer II**.

### Check These Exclusive Features

MEMORY-SENSE adjusts to computer's memory (16-64K) for maximum work space; TYPE-AHEAD, TYPAMATIC KEY REPEAT and KEY BEEP for the pros; 3 PROGRAMMABLE FUNCTIONS; AUTO PHRASE INSERT; COLUMN CREATION; TEXT FILE LINKING; HELP MENU; A TRUE EDITING WINDOW IN ALL 9 DISPLAY MODES; TRUE FORMAT WINDOW to display line lengths up to 255 characters, with horizontal and vertical scrolling to replicate the printed page including centered lines, headers, footers, page breaks, page numbers, margins, giving a perfect printed document every time. Also makes hyphenation a snap; **TRUE AUTOMATIC JUSTIFICATION** for neat, even left and right hand margins; Ability to use CHARACTER CODES for printing special characters available with your printer; freedom to embed as many PRINTER CONTROL CODES as desired anywhere in the text, **EVEN WITHIN JUSTIFIED TEXT**; 90-plus page tutorial manual.

**ADDITIONAL DISK FEATURES:** Read a directory, Display free granules, Save with Automatic Verification, Load and Append ASCII files, and BASIC programs, Kill files, and Link files from disk for continuous printing. 54K bytes of workspace available with a 64 K system. Only the best offers all of these features.

TAPE \$69.95

ROMPAK \$89.95

DISK \$99.95

Tutorial only \$15.00 (Refundable with purchase)  
Tape & Disk require 32K for lowercase display  
Previous Super "Color" Writer II owners call for upgrade policy.

## Super "Color" Mailer™

By Tim Nelson

The **Super "Color" Mailer** is a powerful multi-purpose mailing list merging and sorting program including lowercase display that uses files created by the **Super "Color" Writer II**. Combine files, sort and print mailing lists, print "Boilerplate" documents, automatically insert text in standardized forms, address envelopes, the list is endless.

TAPE \$39.95

DISK \$59.95

Operators Manual only \$10.00 (Refundable with purchase)

## NEW Super "Color" Speller™

By Peter A. Stark

The **Super "Color" Speller** is a fast machine-code proofreading program to correct **Super "Color" Writer** files. Automatically proofreads your documents against a 20,000 word stock dictionary, plus your own customized dictionary and corrects typos or marks them for special attention.

AVAILABLE ON DISK ONLY \$69.95

Operators Manual only \$10.00 (Refundable with purchase)



# 32x16 & 51-64-85x21&24 Display With Lowercase Descenders And 16 Thru 64K Too!

## NEW Super "Color" Calc™

ELECTRONIC SPREADSHEET By Kevin Herrboldt

Now you can answer those "What if?" financial projection, forecasting, budgeting, engineering and calculating questions with precision, speed and power using the Super "Color" Calc, truly the finest electronic worksheet and financial modeling program available for the Color Computer, from 16 to 64K. Now every Color Computer owner has access to a calculating and planning tool rivaling VisiCalc™ containing all its features and commands and then some. You need only change one variable and you instantly see how that change affects your assumptions. You can even use VisiCalc templates freely with Super "Color" Calc! Combine spread sheet tables with Super "Color" Writer II documents to create ledgers, projections, statistical and financial reports and budgets.

**Features include:** 9 display formats; standard 32x16 & 51-64-85x21&24 with real lowercase descenders \* MEMORY-SENSE to adjust to computer's memory (16-64K) for maximum work space; Full-size 63x256 worksheet \* Easy to use \* HELP Menus to make learning faster \* Machine code speed and high precision \* Total flexibility in calculating \* Up to FOUR VIDEO DISPLAY WINDOWS to compare and contrast results of changes \* Sine and Cosine functions, Averaging, Exponents, Algebraic functions, and base 10 or 16 entry \* Multi-layered Column and Row Ascending and Descending sorts \* Locate formulas or titles in fields \* Easy entry, replication and block moving of frames \* Global or Local column width control up to 81 characters each \* Create titles of up to 255 characters \* Typamatic Key Repeat \* Key beep \* Type-ahead \* Print up to 132 column worksheet \* Prints at any baud rate from 110 to 9600 \* Print formats savable along with worksheet \* Enter control codes for customized printing.

**DISK FEATURES:** Read a directory; Display free granules; Kill files, Save with Automatic Verification; Load files; Append disk files for complete worksheet printing. 54K bytes of worksheet space available with a 64K system.

Tutorial and sample templates are supplied with the program.

**ROMPAK \$89.95** **DISK \$99.95**

Tutorial only \$15.00 (Refundable with purchase)  
Disk requires 32K for lowercase display.

## Super "Color" Disk-ZAP™

By Tim Nelson

Now the dreamed-of repair of I/O errors is a reality. The Super "Color" Disk-ZAP™ is the ultimate repair utility for simple and quick repair of all repairable disk errors. Designed with the non-programmer in mind, the Super "Color" Disk-ZAP™ will let you retrieve all types of bashed files, including BASIC and Machine Code programs.

This high-speed machine code disk utility has a special dual cursor screen display to show HEXIDECIMAL and ASCII displays simultaneously. You are able to: Verify or modify disk sectors at will \* Type right onto the disk to change unwanted program names or prompts \* Send sector contents to the printer or any other RS-232 device \* Search the entire disk for any grouping of characters \* Copy sectors \* Backup tracks or entire disks \* Repair directory tracks and smashed disks \* Full prompting to help you every step of the way \* 50-plus page Operators Manual which helps you simply and quickly fix the vast majority of disk errors, and teaches the rudiments of disk structure and repair.

**AVAILABLE ON DISK ONLY \$49.95**

Operators Manual only \$10.00 (Refundable with purchase)

**NELSON™  
SOFTWARE  
SYSTEMS**



9072 Lyndale Avenue So. 612/881-2777

A Division of Softlaw Corporation Minneapolis, Minnesota 55420 U.S.A.

TRS-80 is a trademark of Tandy Corp. Visicalc is a trademark of VisiCorp.

**WE TAKE THE COLOR COMPUTER SERIOUSLY.  
AUTHORS' SUBMISSIONS ARE ENCOURAGED.**

## Super "Color" Terminal™

THE FINEST TERMINAL PROGRAM ANYWHERE!

Version 3.0 By Dan Nelson

The best has become even better, with many new features including 9 display formats; 32x16 & 51-64-85x21&24 with real lowercase descenders, plus compatibility with the 64K Color Computer. This user-friendly program makes communicating with ANY computer a breeze even for a newcomer. Communicate using your modem with all the popular information services such as Dow Jones, Compuserve, The Source, and local BBS's, clubs, friends, or the main-frame at work. You can also communicate directly with other microcomputers, such as the TRS-80 I/III, II, other Color Computers, Apples, IBM PCs, etc., via RS-232 without using a modem. Save the information or PRINT IT!

**FEATURES:** MEMORY-SENSE to adjust to computer's memory (16-64K) for maximum work space; Selectively print data at baud rates from 110 to 9600 \* 54K of data storage with 64K disk system. 128 character ASCII keyboard \* Automatic graphics mode \* Word mode (word wrap) for unbroken words \* Send & receive Super "Color" Writer II, Database & Calc files, ASCII files, Machine Language & BASIC programs \* Set communications baud rate from 110 to 9600, Duplex: Half/Full/Echo, Word length: 5 6 7 or 8, Parity: Odd/Even or None, Stop Bits: 1-9 \* Local linefeeds to screen \* Save and load ASCII files, Machine Code & BASIC programs \* Unique CLONE feature for copying any tape \* Lower case masking \* 10 Keystroke Multiplier (MACRO) buffers to perform repetitive pre-entry log-on tasks and send short messages \* Programmable prompt or delay for send next line \* Selectable character trapping \* Files compatible with other Library programs.

**ADDITIONAL DISK FEATURES:** Works with up to four Disk Drives; Call a directory, Print free space, Kill disk files, Save with Automatic Verification and Load textfiles or BASIC programs; Save and Load KSM'S to the disk.

**TAPE \$49.95** **ROMPAK \$59.95** **DISK \$69.95**

Operators Manual only \$10.00 (Refundable with purchase)

Previous Super "Color" Terminal owners call for upgrade policy.

## NEW Super "Color" Database™

By Dan Nelson

This high speed machine language program including true lowercase displays fills all your information management needs, be they for your business or home. Inventory, accounts, mailing, lists, family histories, you name it, the Super "Color" Database will keep track of all your data.

The Super "Color" Database features MEMORY-SENSE to adjust to computer's memory (16-64K) for maximum work space. It is structured in a simple and easy to understand menu system with full prompting for easy operation. Your data is stored in records of your own design, each divided into as many fields as you need. All files are fully indexed for speed and efficiency. Full sort of records is provided for easy listing of names, figures, addresses, etc., in ascending or descending order. The math package performs arithmetic operations and updates other fields which is especially useful when used as an order entry and invoicing system. You can create reports, or lists for mailings, or whatever. Create files compatible with the Super "Color" Writer II and Terminal. Up to five different print formats are available, and control codes may be imbedded for customized printing.

**AVAILABLE ON DISK ONLY \$79.95**

Operators Manual only \$10.00 (Refundable with purchase)

**For Orders ONLY Call Toll Free**



**1-800-328-2737**



Customer service and product support call (612) 881-2777.

MAIL ORDERS: \$3 U.S. Shipping (\$4 CANADA, \$10 OVERSEAS)

Personal checks allow 3 weeks. **ORDERS SHIPPED SAME DAY!**

**Available at Dealers everywhere.**

**If your Dealer is out of stock ORDER DIRECT!**

*Just when you thought  
it was safe to go back  
to your CoCo . . .*

## NOW COMES SNAIL'S REVENGE

By Fred B. Scerbo



Some of you may recall a program which appeared in *the Rainbow* over a year ago called *Snail Invaders* which was written with the help of Dale 'Snail' Haggerty. Since the publication of that game, many CoCo users have been asking if and when a follow-up to that game would appear. Well, the wait is finally over. With a little graphic help from Dale, we have an even better graphic game now called *Snail's Revenge*.

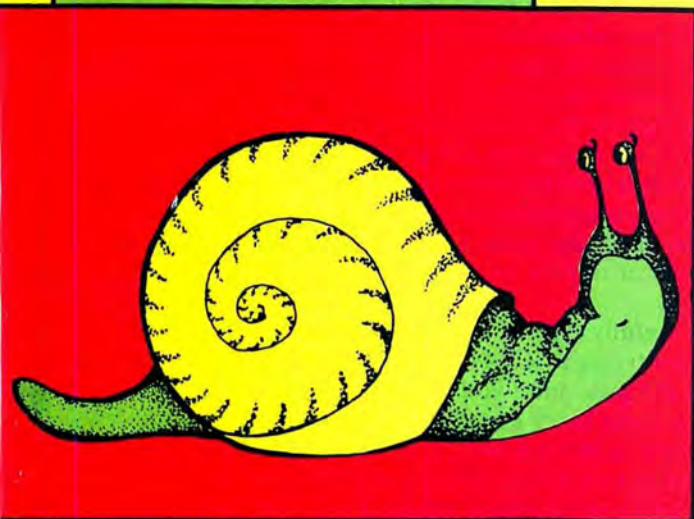
Dale, a Junior at Drury Senior High School in North Adams, Massachusetts, has not had as much time available to devote to the CoCo this year as he did in the past. Still, we were able to find the time for him to design a new *Snail* graphic and a more impressive title card which appears at the top of the screen. The animation and actual game mechanics are my own. A number of IMB graphic techniques have been further sharpened to milk the maximum speed available from Extended Color BASIC. Originally, this game was written on a 32K machine. However, since a greater number of CoCo owners are still at the 16K level, a little extra time was spent cramming the same graphics into 16K. The result was an even more efficient, structured program.

Now, for a few words about how *Snail's Revenge* works.



*Snail* is written in PMODE 1:SCREEN1,0. The choice of PMODE 1 over PMODE 3 was for several reasons.

First, there is not too great a difference in the resolution between PMODE 3 and 1. PMODE 3 uses graphic pixels which are rectangular in shape. If we go to PMODE 1, our pixels are twice as wide, and we can obtain a smoother



graphic since our pixel settings are not irregular, but perfect squares.

Secondly, PMODE 1 uses half as much memory as PMODE 3. Since this program will use the *PCOPY* command, we need to copy only one page for our animation. The graphics also execute more rapidly since less graphic memory must be relocated by the *PCOPY* command. Of equal advantage is the additional memory this gives us for actual program operation.

The actual execution of this game takes place in only one graphic page which occupies half of the viewing screen. The top half of the screen (page 1) is reserved for the title card and scoring mechanisms. Our game action takes place on page 3 which is *PCOPY* to page 2 which occupies the bottom half of the screen. Since all animation is taking place on page 3 which remains out of view, our movement becomes virtually "flicker-free."

While *Snail Invaders* received its inspiration from other *Invader* style games, *Snail's Revenge* is a distant cousin of the many Pac or Dig games found on the market or in the arcades. The plot is relatively simple, but game play is far from a breeze.

You are The Snail. You are trying to work your way out of a four-level maze.

|             |              |
|-------------|--------------|
| 5.....0F0B  | 54.....1867  |
| 17.....1102 | 69.....1A99  |
| 26.....1354 | 95.....1D89  |
| 45.....15A6 | 109.....1F78 |
|             | END ...218A  |

The listing:

```

1 PCLEAR3:POKE65495,0: CLEAR190:D
IMW(12),Z(12),U(9),D(9),L(9),R(9
),N(9),AE(12),BE(14),CE(17),V(9
),O(4)
2 CLS0:R#=CHR$(128):FORS=-16TO80
STEP16:FORI=258TO387STEP32:PRINT
@I-K,STRING$(5,159+S);:NEXT:PRIN
T@418-K,STRING$(5,156+S);:PRINT@
450-K,STRING$(5,128);
3 FORY=0TO6STEP6:PRINT@264+Y-K,C
HR$(145+S)+CHR$(159+S)+CHR$(159+
S)+CHR$(159+S)+CHR$(146+S);
4 FORI=296TO392STEP32:PRINT@I+Y-
K,STRING$(5,159+S);:NEXTI:PRINT@
424+Y-K,STRING$(5,156+S);:PRINT@
456+Y-K,STRING$(5,128);:NEXTY
5 FORY=0TO96STEP96:PRINT@276+Y-K
,STRING$(9,159+S);CHR$(155+S);R#
;:PRINT@308+Y-K,STRING$(10,159+S
);CHR$(152+S);R#;:PRINT@340+Y-K,
STRING$(9,156+S);CHR$(152+S);R#;
:PRINT@372+Y-K,STRING$(11,128);:
NEXTY:K=K+32:NEXTS
6 PMODE1,1:PCLS:COLOR2,3:LINE(0,
160)-(256,192),PSET,BF:LINE(0,16
0)-(256,160),PRESET
7 DRAW"S8BM120,176C3F3DLRDR5E3UH
2L3G2DFR2EHL"
8 DRAW"BM61,176C3G3DRDL5H3UE2R3
F2DGL2HER":PAINT(20,170),1,3
9 COLOR1,1:GET(120,174)-(144,186
),W,G
10 GET(39,174)-(63,186),Z,G:L#=C
HR$(129):Q#="DPMPS"+L#+ "DPNQVUFS
"+L#+ "HBNF"+L#+ "CZ"
11 FORI=0TO160STEP40:CIRCLE(20+I
,20),12,3,.9
12 PAINT(20+I,20),3,3
13 LINE(8+I,10)-(32+I,30),PRESET
,B
14 PSET(20+I,16,2)
15 NEXTI
16 LINE(32,10)-(22,20),PRESET:LI
NE-(32,30),PRESET:PAINT(24,20),1
,1
17 FORS=1TO22:F=ASC(MID$(Q$,S,1)

```



```

)+31:PRINT@324+S,CHR$(F);:NEXTS:
Q$="GSFE"+L$+"TDFSCP"
18 FORS=1TO11:F=ASC(MID$(Q$,S,1)
)+31:PRINT@394+S,CHR$(F);:NEXTS
19 L$=CHR$(209):Q$="TOBJM"+L$+"E
FTJHOFE"+L$+"CZ"+L$+"EBMF"+L$+"I
BHHFSUZ"
20 FORDH=1TO31:ZL=ASC(MID$(Q$,DH
,1)):POKE1472+DH,ZL-65:NEXTDH
21 Q$="BRC1NU4RU4RD4RU4RD4RU4RNL
4D2NL4D2L6C4":FORI=0TO9:READZ$(I
):NEXT
22 DATA BR2U4R3D4NL3,BR4NU4BR,BR
2U2R3U2NL3BD4NL3,BR2R3U2NL2U2NL3
BD4,BR2BU2NU2R3U2D4,BR2R3U2L3U2R
3BD4,BR2U4NR3D2R3D2NL3,BR2BU4R3D
4,BR2U4R3D2NL3D2NL3,BR2BU2NR3U2R
3D4
23 EX$="01L255BC":I=0:FORII=11TO
227STEP27:I=I+1:V(I)=II:NEXTII
24 I=0:FORII=7TO77STEP22:I=I+1:O
(I)=II+96:NEXTII:I=0
25 LINE(70,32)-(60,22),PRESET:LI
NE-(50,32),PRESET:PAINT(60,24),1
,1
26 LINE(88,30)-(98,20),PRESET:LI
NE-(88,10),PRESET:PAINT(96,20),1
,1
27 LINE(130,8)-(140,18),PRESET:L
INE-(150,8),PRESET
28 PAINT(140,16),1,1
29 COLOR2,3:LINE(26,16)-(22,20),
PSET:LINE-(26,24),PSET
30 LINE(64,26)-(60,22),PSET:LINE
-(56,26),PSET
31 LINE(94,24)-(98,20),PSET:LINE
-(94,16),PSET
32 LINE(144,14)-(140,18),PSET:LI
NE-(136,14),PSET
33 FORI=0TO80STEP40:CIRCLE(20+I,
80),14+LL,2,.9
34 COLOR2,1:LINE(6+I-LL,68-LL)-(
34+I+LL,92+LL),PRESET,B
35 PAINT(20+I,80),2,2
36 CIRCLE(20+I,76-LL),2+LL,2,.9:
LL=LL+2:NEXT
37 FORYP=0TO40STEP40:FORKP=1TO40
+YP:PSET(RND(40)+20+YP,RND(20)+7
0,3):NEXTKP,YP
38 GET(6,68)-(34,92),AE,G
39 GET(44,66)-(78,94),BE,G
40 GET(82,64)-(122,96),CE,G
41 COLOR3,1
42 GET(10,12)-(30,28),R,G
43 GET(50,12)-(70,28),D,G
44 GET(90,12)-(110,28),L,G
45 GET(130,12)-(150,28),U,G

```

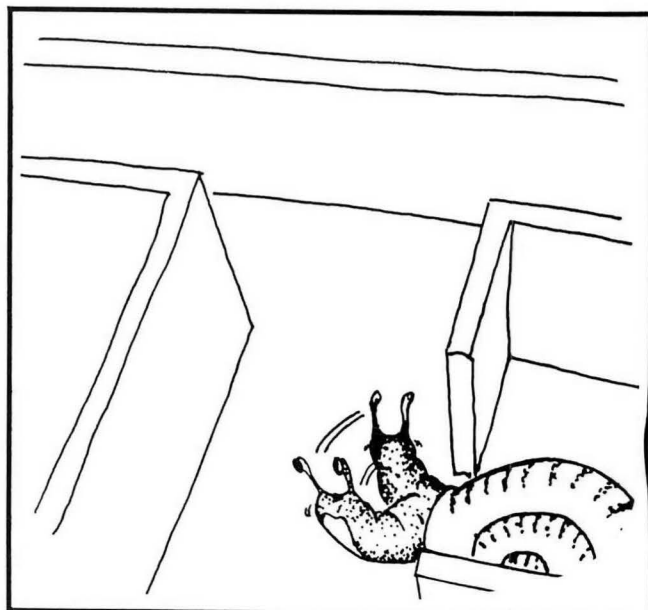
Unfortunately, the corridors of the maze are stalked by a hungry Pac-person with sharp teeth and glassy eyes. You must cautiously work your way through the maze, while your adversary can pass through walls at will. If he attacks you, he will swallow you after rapidly grinding you to snail pulp with his sharp teeth. (Pay particular attention to this gobbling sequence which you do not often find in other games.)

Fortunately, you do have a means of defense. Whenever the small box below the snail at the top of the screen turns red, you will obtain the ability to fire a hose into the Pac-fiend and inflate him to twice his size before he bursts open. Unfortunately, you must be on the same level as your foe. You cannot pass through walls as he can. If you "blow-up" your opponent, you will gain 10 points. If you make it to the end of the maze, you will gain 50 points. Thus, it will take some skill to work your way out of the maze while remaining close enough to blast your hunter. Once you have been eaten eight times, the game ends. (A reverse Pac-opponent will appear at the top of the screen whenever you become his meal.)

Carefully type in the listing. Be sure to *POKE 65494,0* before trying to *CSAVE* this program. Also, do not try to run the game until you have entered all the lines. We have done some fancy encoding to keep you guessing what will happen with each line. I have also included a new IMB introduction which appears in text while the graphics are drawn on the graphics' screen. Your right joystick operates the snail while the fire button controls your shooting.

With a little typing, you will have an arcade game which rivals machine language in speed while using the special features found in Extended BASIC. When trying to reload this program, be sure to *PCLEAR 3* or the program will not fit in memory. (Only about 200 bytes remain when running the game.) If your machine cannot handle the *POKE65495,0* then leave it out. The game still has impressive speed without it. This game will work with disk, but you will need 32K.

Enjoy *Snail's Revenge!* While you do, I'll see if I can motivate "Snail" to come up with some ideas for Snail III. (Maybe *Donkey Snail* or *Snail-A-Pede*. Who knows? Only time at the CoCo will tell!

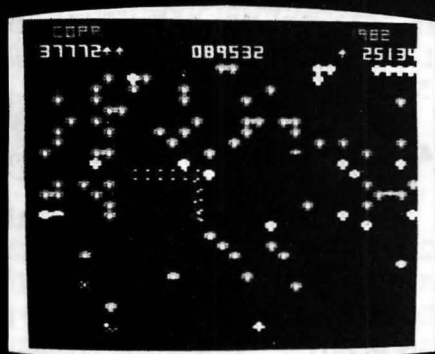




# Setting The Standards

## WHAT THEY ARE SAYING ABOUT COLORPEDE

"...forefront of the pack..." the Rainbow, Dec. '82 "...an outstanding offer." N. Vernon, IN "...the best graphics I have seen to date" Erie, PA  
"It is great!" Dayton, OH "...the best graphics and playability of any color computer game." McKeesport, PA



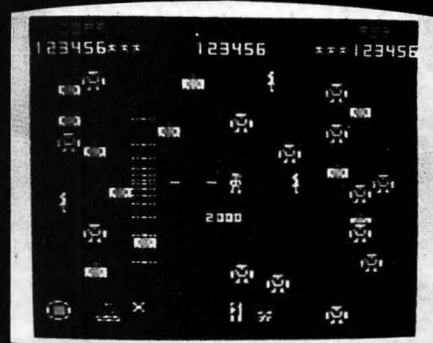
## COLORPEDE

This truly outstanding engineer designed, 100% machine language game with multi-colored high resolution characters and fast action will challenge the most avid arcade buff. Can be played by 1 or 2 players controlled with joy sticks or key board. Joy stick control is fast, smooth and accurate. As COLORPEDE slithers through the toad stools, you attempt to destroy the COLORPEDE, knock out the menacing Bouncing Bug and eliminate toad stools while accumulating higher and higher scores. Demonstration mode with top 5 scores. Pause feature. For 16K Color Computer and TDP-100.

**Cassette-\$29.95**

**Disk \$34.95**

## INTRODUCING



## ROBOTTACK

Ultra fast arcade action with colorful high resolution graphics. You are the super human who must fight off the attacking robots and save the remaining humans from destruction. You have super powers, can shoot in any direction and move anywhere on the screen to accomplish your vital mission.

Engineer designed, 100% machine language. Can be played by 1 or 2 players with joy stick control. Top 5 scores displayed. Pause feature. For 16K Color Computer and TDP-100 with joy sticks.

**Cassette-\$24.95**

### TO ORDER:

VISA, MASTERCARD, Money Order. Please allow 2 weeks for checks. Add \$1.50 for shipping, \$3.00 outside U.S. 4% tax in Mich.

  
**intracolor**  
**COMMUNICATIONS**

P.O. Box 1035, East Lansing, MI 48823  
(517) 351-8537

**DEALER INQUIRIES INVITED.**

**FOR THE COLOR COMPUTER & TDP-100**



## PREMIUM SOFTWARE

DISK MONEY MINDER is a family budget tool. It allows you to set up a family budget with as many as 56 user definable categories. You may print out balances, change category names, search a year (or a month or whatever) of records (for tax purposes for example). DISK MONEY MINDER allows 24 sets of entries and 56 user definable categories at one time. You may break checks and deposits into any number of categories. DISK MONEY MINDER is menu driven and easy to use. Excellent manual with plenty of examples.

Requires 32K plus DISK

\$19.95

MONEY MINDER II is the cassette version of DISK MONEY MINDER. Reviewed in April 1982 Rainbow and improved since then!

Requires 16K but does NOT require Extended Basic

\$14.95

PIE-CHART is a unique graphing program. It allows you to enter data such as monthly bills, yearly expenditures, etc. This data may be entered as percentages or in its "raw" state. Data entered raw will be converted to percentages by the program. The resulting PIE-CHART can be saved to tape or the data itself can be saved to tape for later use. By using a screen print program (not supplied) you can make printouts of the pie-charts. One unique feature of the program allows you to save a large number of pie-charts or other hi-resolution screens to tape and reload and display them one at a time by "flipping" through them quickly much as you might do with a slide show presentation. This feature would be great for a sales presentation, club meeting or retail display. Other features—automatic screen writing i.e. designations—up to 20 entries possible per pie-chart—keyboard toggle of "raw" vs percentage data entry.

PIE-CHART needs 16K and Extended Basic

\$10.95

AMORT asks you to input the amount of a loan, the term of the loan and it's interest rate. The program will print to screen and/or to your printer and will give you: 1—a running total of principal still to be paid. 2—The amount of the monthly payment applied to principal. 3—The amount of the monthly payment applied to interest. 4—The total monthly payment. 5—The total amount paid into principal to date. 6—The total amount paid into interest to date. 7—The total amount paid out to date.

Requires 16K and Extended Basic

\$11.95

COLORHYTHM is a biorhythm program for your Color Computer. It plots in High-Resolution graphics (PMODE3) and color a 15 day biorhythm chart displaying your intellectual, Emotional & Physical biorhythms. Reviewed in August 1982 Rainbow.

Requires 16K & Extended Basic

\$9.95

### \*\*\* EDUCATIONAL \*\*\*

MATCH & SPELL combines a game similar to the familiar TV game of CONCENTRATION and a spelling drill to provide a truly unique and fun program. You may load a spelling list (up to 32 words of up to 11 letters each) from tape or keyboard. The program then allows you to study the list for as long as you like. After that the game begins. One of your words is presented to you either correctly or misspelled with a common spelling error. You are asked if it is spelled right. Then the correctly spelled word is displayed for a brief time and you are then asked to spell the word. The CONCENTRATION type game is played by one or two players during the spelling drill.

A lot of fun for 16K and Extended Basic

\$11.95

PRESCHOOL PAK consists of two programs for preschooler learning fun. ALPHABET drills the child in alphabet recognition and rewards a correct answer. COUNTER drill the child in counting to 10. Both use Hi-Resolution graphics and sound. Reviewed in September 1982 Rainbow.

\$8.95

MATHWAR is an educational game. In the game the player must jump one space-fighter over another checkers style, until only one fighter remains. Each time a move is selected the program will not complete the move until a math problem is answered correctly. The player selects addition of subtraction and one of four difficulty levels. Level 1 is problems with numbers up to 19 but no carrying or borrowing is required. Level 2 is the same as Level 1 but numbers up to 99 are allowed. Level 3 uses numbers up to 19 but allows carrying and borrowing problems. Level 4 is the same as Level 3 with numbers up to 99. No negative responses to wrong answers and the math score is displayed at the end of the game.

Requires 16K and Extended Basic

\$11.95

We pay postage on all orders.



```
46 GET (170, 12) - (190, 28), N, G
47 PMODE1, 1: PCLS: SP=9: LV=4: GOSUB
48: GOTO50
49 I=40: J=40: ZZ=8: OO=6: K=40: M=40
: A=4: B=3: PMODE0, 3: PCLS: PMODE1, 2:
COLOR2, 1: LINE (2, 100) - (252, 186), P
SET, B: LINE (0, 98) - (256, 188), PSET,
B: LINE (30, 120) - (256, 122), PSET, B
49 LINE (0, 142) - (226, 144), PSET, B:
LINE (30, 164) - (256, 166), PSET, B: LI
NE (228, 98) - (250, 100), PRESET, B: RE
TURN
50 PMODE1, 1: PCLS: SCREEN0, 0: DRAW"
S16BM0, 32; C4E4L3E4R3G3R3G5NL3BR2
E5R2F2E2R2G5L2H2G2L2BR10E5R3D5L2
UBUL2ERDBDL3GL2BR10U5R3D5L3BR5U5
R2D3RF2NL5BRBU5RDBD4BR3E2L3E3R3G
2R3G3L3"
51 FORIU=1TO6: READPA: PAINT (PA, 26
), 4, 4: NEXTIU
52 DATA10, 50, 88, 106, 130, 170
53 DRAW"BM28, 66C3L2H3BUU2RD2LBDD
3L2U7R4FD2GF3BRU7R4DL2D2RDL2R2D
NL4BR4H3U4R2D3FREU3R2D4G3NLBR4U7
R4DL2D2RDL2R2DNL4BR8L2H3D3L2U7R
2F3U3R2D7BR7L4H2U3E2R3FD2L2UL2D3
FRULURR3DL2BR2U7R4DL2D2RDL2R2D
L4"
54 FORFL=1TO7: READ KL: PAINT (KL, 4
6), 3, 3: NEXTFL
55 DATA6, 38, 58, 90, 110, 142, 172
56 PUT (212, 16) - (236, 28), Z, PSET
57 LINE (208, 38) - (236, 48), PSET, B:
GOSUB119: GOTO60
58 P=I-2: Q=J: S=K+2: T=M: I=V(A): J=
O(B): K=I+20: M=J+16: COLOR1, 1
59 PMODE1, 2: PUT (I, J) - (K, M), N, PSE
T: PCOPY3TO2: LINE (I, J) - (K, M), PRES
ET, BF: LINE (V(SP), O(LV)) - (V(SP)+2
4, O(LV)+12), PRESET, BF: RETURN
60 PMODE1, 1: SCREEN1, 0: QR=RND (TIM
ER): RV=RND (10): IFRV>3THEN62
61 LINE (212, 42) - (232, 44), PRESET,
B: RG=0: GOTO63
62 LINE (212, 42) - (232, 44), PSET, B:
RG=1
63 PMODE1, 2: QR=RND (10): ONQR GOTO
64, 67, 70, 73, 67, 67, 67, 73, 73, 73
64 B=B-1: IFB<1THEN66
65 GOSUB58: PUT (I, J) - (K, M), U, PSET
: GOTO76
66 B=1: E=RND (2): IFE=1THEN67ELSE7
3
67 A=A+1: IFA>9THEN69
68 GOSUB58: PUT (I, J) - (K, M), R, PSET
: GOTO76
69 A=9: E=RND (2): IFE=1THEN64ELSE7
0
```



# Genesis Software

presents

## Color Computer Programs

### ★ Secret Of The Crypt **New!!!**

The BIG adventure continues. The sequel to the popular "Enchanted Forest" is here! You'll move in more than 50 hi-res, 3-D graphic scenes searching for clues in an attempt to enter the crypt. But beware, the trail to the crypt is beset with puzzlements. In fact, the crypt's secret will remain a mystery to all but the most adventuresome. Requires 32K extended basic.

Tape cassette (postage paid).....\$21.95

### ★ Bigfoot

Hunt Bigfoot in a hidden maze of caverns and twisting tunnels that are displayed in hi-res graphics as you move. Seek out the lair of Bigfoot while avoiding perils along the way. Features multiple levels and many options of play. Each hunt takes place in a new, randomly generated maze. Challenging and fun. Requires 32K extended basic. Tape cassette (postage paid).....\$21.95

### ★ The Enchanted Forest

The BIG adventure in hi-res graphics. Move through more than 50 scenes on a quest to rescue the captive princess. Decisions are made according to visual clues, not text. There are many inhabitants in the Enchanted Forest — some are friendly, some are not. This is a sophisticated computer adventure — a real challenge. A must for your adventure library. Requires 32K extended basic. Tape cassette (postage paid).....\$21.95

(The Enchanted Forest was reviewed in the Dec. 1982 issue of Rainbow).

### ★ The Game Show

Now a lively party game where two teams compete against the clock to name several items in a category. Includes 60 rounds with color graphics and sound. Machine language routine for fast response. Requires 16K extended basic and joysticks. Tape cassette (postage paid).....\$19.95

(The Game Show was reviewed in the Jan. 1983 issue of Rainbow).

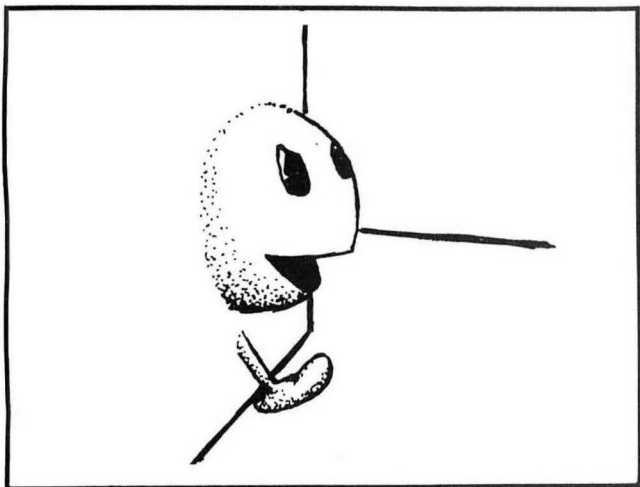
## Genesis Software

P.O. Box 936, Manchester, Mo. 63011

Personal checks welcome - no delay.  
Missouri residents add 5.625 percent sales tax.



```
70 B=B+1:IFB>4THEN72
71 GOSUB58:PUT(I,J)-(K,M),D,PSET
:GOTO76
72 B=4:E=RND(2):IFE=1THEN67ELSE7
3
73 A=A-1:IFA<1THEN75
74 GOSUB58:PUT(I,J)-(K,M),L,PSET
:GOTO76
75 A=1:E=RND(2):IFE=1THEN64ELSE7
0
76 PLAY"L25501C04CD":IF SP=A AND
LV=B THEN77ELSE78
77 PMODE1,2:LINE(V(SP),O(LV))-(V
(SP)+24,O(LV)+12),PRESET,BF:PUT(I,
J)-(K,M),N,PSET:GOTO108
78 JH=JOYSTK(0):IFJH>32THEN90
79 SP=SP-1:IFSP<1THENSP=1
80 IFLV=4ANDSP=1THEN83
81 IFLV=2ANDSP=1THEN83
82 GOTO85
```



```
83 JV=JOYSTK(1):IFJV<16THENLV=LV
-1
84 GOTO89
85 IFLV=3ANDSP=1THEN88
86 IFLV=1ANDSP=1THEN88
87 GOTO89
88 JV=JOYSTK(1):IFJV>46THENLV=LV
+1
89 PUT(V(SP),O(LV))-(V(SP)+24,O(L
V)+12),W,PSET:GOTO101
90 SP=SP+1:IFSP>9THENSP=9
91 IFLV=3ANDSP=9THEN95
92 IFLV=1ANDSP=9THEN93ELSE97
93 PMODE1,2:PUT(V(9),O(LV))-(V(9
)+24,O(LV)+12),Z,PSET:PCOPY3TO2:
LINE(V(9),O(LV))-(V(9)+24,O(LV)+
12),PRESET,BF:PMODE1,1:FORPC=1TO
5:M2=M2+1:GOSUB119:SOUND200,1:NE
XT
94 LV=4:SP=9:GOTO97
95 JV=JOYSTK(1):IFJV<16THENLV=LV
```

```

-1
96 GOTO100
97 IFLV=2ANDSP=9THEN99
98 GOTO100
99 JV=JOYSTK(1):IFJV>46THENLV=LV
+1
100 PUT(V(SP),O(LV))-(V(SP)+24,O
(LV)+12),Z,PSET
101 IF SP=A AND LV=B THEN108ELSE
PCOPY3TO2:PMODE1,1:SCREEN1,0:PMO
DE1,2:LINE(I,J)-(K,M),PRESET,BF
102 IF PEEK(339)=255THEN60
103 IF RG=0THEN60
104 IF LV<>B THEN60
105 PMODE1,1:LINE(V(SP)+12,O(LV)
+6)-(I+10,J+6),PSET
106 GOTO115
107 GOTO60
108 LINE(V(SP),O(LV))-(V(SP)+24,
O(LV)+12),PRESET,BF:FOREM=1TO5:P
UT(I,J)-(K,M),N,PSET:PLAYEX$:PCO
PY3TO2:PUT(I,J)-(K,M),D,PSET:PLA
YEX$109 PCOPY3TO2:NEXTEM:PMODE1,
1:SCREEN1,1:PMODE1,2:LINE(I,J)-(
K,M),PRESET,BF:LINE(V(SP),O(LV))
-(V(SP)+24,O(LV)+12),PRESET,BF:P

```

```

MODE1,1:SCREEN1,1:SCREEN1,0:SP=9
:LV=4
110 MS=MS+1:PUT(MS*24-24,74)-(MS
*24-4,90),R,PRESET:IFMS=>8THEN11
2
111 GOTO60
112 FORI=1TO1000:NEXT
113 X$=INKEY$:IFX$=""THEN113
114 RUN
115 PMODE1,2:PUT(I-4,J-3)-(K+4,M
+5),AE,OR:PCOPY3TO2:PLAYEX$+EX$
116 PUT(I-6,J-5)-(K+8,M+7),BE,OR
:PCOPY3TO2:PLAYEX$+EX$
117 PUT(I-10,J-7)-(K+10,M+9),CE,
OR:PCOPY3TO2:PLAYEX$+EX$
118 M2=M2+1:GOSUB119:GOSUB48:GOT
O60
119 IFM2>9THENM3=M3+1:M2=0
120 IFM3>9THENM4=M4+1:M3=0
121 IFM4>9THENM5=M5+1:M4=0
122 IFM5=>10THENM5=0
123 PMODE1,1:DRAW"C4S8BM188,64"+
Q$+Z$(M5)+Q$:DRAWZ$(M4)+Q$+Z$(M3
)+Q$:DRAWZ$(M2)+Q$+Z$(M1):RETURN
124 'SNAIL'S REVENGE BY F.SCERBO
&D.HAGGERTY,(C)1983,IMB,P.O.BOX
289,WILLIAMSTOWM,MA,01267

```

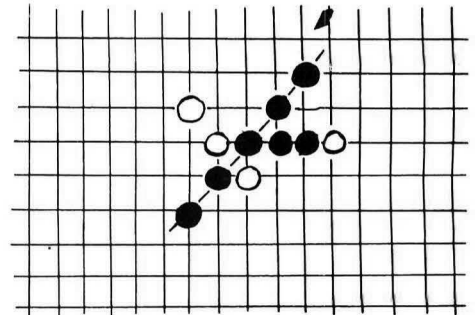
## 'NEW' KODOMO~NO~GO

Get 5 in a row before your opponent. 19 x 19 playing matrix. This is the favorite relaxation game for Japanese Go players. Two-player version and 4 computer skill levels for one player: also Tic-Tac-Toe on the same tape.

\$19.95 32K Ext. Basic cassette only.

\$14.95 16K Ext. Basic. Three skill levels plus Tic-Tac-Toe.

\$ 8.95 16K Ext. Basic Tic-Tac-Toe only.



## 'ALSO' CO~EXISTENCE

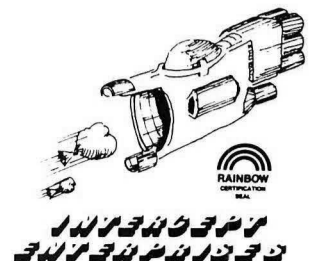
Successfully develop your country in a resource-limited world. Form a world government, sign treaties, go to war: anything goes. This is a two - to six - player game which combines computer and board play (board and pieces provided).

\$24.95 16K Ext. Basic cassette only.

## 'AND' 5 EXCITING GAMES

Be a Cosmic Trash Collector, fight a mighty space battle, or surround your opponent in Trap'em — all this and more on one tape. The RAINBOW says, "Great fare for the family with young children."

\$15.95 16K Ext. Basic cassette.



P. O. Box 4016  
Cherry Hill, NJ 08034



# Double Density Software

## COLOR TERM + PLUS +

An Intelligent Terminal Program For The Color Computer or TDP 100.

### Features:

- BAUD RATE — 110 to 19200
- Half or Full Duplex
- One or two Stop Bits
- Odd, Even or No Parity
- Word WRAP
- Turn off Lowercase Letters
- Send All Control Characters
- Print Buffer
- Examine Buffer
- Send & Receive BASIC or Machine Language Programs or Files.
- Editor allows entry of text into Buffer as well as Editing of Buffer.
- (Disk Version Has more powerful Editor)

### Special Feature:

Code & Decode ANYTHING in the Buffer for Secure Transmission or Storage Using a User defined key word

PRICE \$29.95 (Tape) \$39.95 (Disk) 16k or 32k Req.



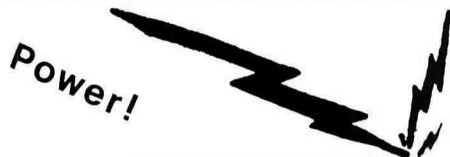
Adventure!



### UNDERGROUND

Tired of playing adventure games that have a limited vocabulary? **Underground** gives a detailed description of your surroundings, just like a main-frame adventure! There are over 90 separate rooms, passageways, etc. Discover what the mysterious machine does, what lies in the Egyptian sarcophagus, how do you tame the guardian of Hell's Gate, where is the fabled golden apple? Everything is up to you. You give the orders, you are the hero. This adventure is not for the faint of heart! You can suspend your game at any time and continue later. Takes from 5 to 20 hours to play.

32K ext. BASIC Req. PRICE \$26.95 Disk only



### COLOR KEY COMMAND

Looking for a powerful programmer's aid, but you don't have a fortune to spend? This program is for you! Look at these features: two keystroke entry of more than 80 Basic, Extend Basic, and Disk Basic commands. Select the color of your cursor. Select the prompt you want — no more "OK" when a program bombs! Automatic line numbering — you select the start line and increment! 4 custom programmable keys for a total of 64 characters each — enter whole lines with two key presses! Copy any line with the copy command. Merge tape programs together automatically. Redefine any or all keys with a short basic program we supply. How can you get all this and more for so little? Because you make the keyboard overlay! We give you a template with all commands printed on it — you cut it out and use it. That is all there is to it! Note: Not all features are available on every machine; some require Extended or Disk Basic to work properly. 16K or 32K Req. PRICE \$18.95 (tape)\* D

### COLOR DOCTOR

Discuss your problems with your computer. **Color Doctor** will discuss your problems with you. This is a great party program! Your friends will not believe that your computer is *talking back to them!* Is it intelligent? It sure seems like it!

16K ext. BASIC Req. PRICE \$15.95 (tape) D

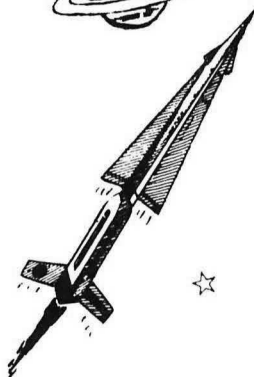
### Use your MODEM for something other than a dust catcher—play games!

Two tapes and two sets of instructions are included with each MODEM game.

**MODEM CHESS** Use your Modem and your Color Computer to play chess *over the phone!* Has high res color graphics board and pieces. Make your move, select a message to send, press a button—seconds later your opponent's board is updated automatically. Has audio alerts, let's you know when a move is being made. 16k or 32k Ext. BASIC Req. PRICE \$39.95 (tape)\*\* D

**MODEM CHECKERS** Play checkers *over the phone!* Program allows up to 4 jumps to be made at a time, crown pieces, etc. 16k or 32k Ext. BASIC Req. PRICE \$39.95 (tape)\*\* D

**MODEM IAGO** Play our version of Othello *over the phone!* Make your move, press a key, your opponent's board is updated seconds later! Has a takeback key if you decide you don't like the move you made. 16k or 32k Ext. BASIC Req. PRICE \$39.95 (tape)\*\* D



### GALACTIC MATH

Load this game into your computer and start playing! This is a math tutor that is really an arcade game! Keep those saucers from landing! There are no "happy faces" or "funny clowns" in this math program. This is a multi-level addition and multiplication quiz. You select the difficulty level. This program uses high resolution color graphics and shows the score, elapsed time, number of hits, number of misses and number of "bases" left to the player. Adults may start this game, but the *kids* will finish it! This program has been teacher and kid tested. Realistic explosions and laser fire sounds make this program a winner! This program rates an A+. For grades 1 and up. 16K or 32 Ext BASIC Req. PRICE \$15.95 (tape) D

### TAPENAME

**Tapename** searches tape and stores the name of any program or file. You can print the information to the screen, printer or tape. Also checks for load errors. 4k, 16k, or 32k Req. or Ext. BASIC. PRICE \$7.95 (tape)\* D

### COLOR DISK SAVER

Saves a disk to tape. Reloads disk from saved tape. Also has tape verify command! 32k Ext. BASIC Req. PRICE \$12.95 (tape)\* D

### CURS0R II

Hate that blinking cursor? Tired of seeing the computer print "OK" after your program just bombed? **Cursor II** changes the cursor to a solid, non-flashing red. Enter any message up to 200 characters in length. Your message will be displayed instead of "OK". 4k, 16k, or 32k Req. or Ext. BASIC. PRICE \$4.95 (tape)\*

### SUPER PEEKER

This is a BASIC program that will allow the user to explore the inside of the color computer. Explore the possibilities with **Super Peeker**. 16k or 32k Ext. BASIC Req. PRICE \$9.95 (tape)\*\*

**COLOR BIORHYTHM** Are you up or down today, tomorrow, or years from now? Find out with **COLOR BIORHYTHM**. Uses high res graphics. Send the chart to printer. 16k or 32k Ext. BASIC Req. PRICE \$14.95 (tape) D

**DD CLOCK** Don't forget what time it is when you are programming. The time is displayed in the upper right corner of your screen. Shows hours, minutes and seconds. Beeps every hour. 4k, 16k, or 32k (Ext. BASIC not required.) PRICE \$9.95 (tape)\* D

**AUTO LOAD** Auto Load will put any program or file from tape to disk! All machine language programs that load below the top of your disk system are modified so that they will operate properly with a disk system! 16k or 32k Ext. BASIC Req. PRICE \$12.95 (tape)\*

### FUNI!

**CLONE ATTACK** Blast those nasties as they appear! 3 skill levels and 9 levels of difficulty. Uses high res color graphics. Joysticks required. 16k or 32k Ext. BASIC only. PRICE \$15.95 (tape) (Disk 32k only)

### FAST!

**MOON BASE INVASION** Nuclear bombs are nearing your cities! Can you stop them before they reach you? High res graphics. 16k or 32k Ext. BASIC Req. PRICE \$12.95 (tape) D

### COLOR IAGO

Based on popular Othello game. Match wits with your computer! Uses high res color graphics. 5 levels of difficulty. Joysticks required. 16k or 32k Ext. BASIC. PRICE \$15.95 (tape) D

COLOR COMPUTER/TDP-100

**SUPER-PRO**  
REPLACEMENT KEYBOARD KIT  
**Save! \$64.95**

\* All machine code D Disk Compatible  
\*\* BASIC with machine code subroutines

Specify Disk when ordering and add \$5.00 per program. Save money and ask that all ordered programs be loaded on one disk. You pay only for the one disk! Please add \$2.00 shipping and handling on all orders. No extra charge on COD orders, Mastercard and VISA accepted. Allow two weeks for personal checks. Your order will usually be shipped within two or three days. We will notify you of any problems within one week. Send 20 cent stamp for free catalog.

### DOUBLE DENSITY SOFTWARE



920 Baldwin Street  
Denton, Texas 76201  
Phone 817/566-2004.





# Celebrating Our 2nd 'Record' Year

Happy Birthday to all 50,000 of us! And what better way to celebrate the beginning of our third year than with a present? We thought about including two candles and a cupcake, but decided against it when it was pointed out that the grooves on the soundsheet would probably get all gummy with icing.

Anyway, we wanted some means by which we could share our excitement and express our appreciation to our readers at the same time. After all, over the entire two year existence of *the Rainbow*, each month has been a new record of growth in size and quality for us, thanks to you!

After a bit of late-night brainstorming, we decided on binding a soundsheet of programs into our 2nd Anniversary issue—if it would work, that is. We ordered a prototype, and received a half-dozen sheets just as they would come from a full pressing run. After trying them out on several home systems by both methods listed here and finding that they all loaded, we were satisfied.

Well, then, there it was. And here it is. Happy Birthday, good friends. We hope you enjoy the party favor. And we hope you enjoy each coming month of *the Rainbow* as we grow toward all the anniversaries to come.



## The Staff

There are three programs on our soundsheet. Please note that these are not meant as "stand alones," but are meant to be used *after* reading the article and any special instructions in the article on how to load and use the program. For instance, *Memory* (page 202) requires a *PCLEAR 1* prior to loading into 16K machines.

### Programs

*Shuffle*, page 196

*Memory*, page 202

*Home Budget Analysis*, page 60.

### Instructions for loading record

Important: Carefully remove soundsheet with the aid of a razor blade or other sharp instrument so as not to warp. Also, before loading *Memory*, page 202, be sure to *PCLEAR 1* if you have 16K.

Method 1 — Integrated stereo system with

built-in cassette tape deck.

Step 1 — Insert blank tape in the cassette deck and put the record on the turntable. If the record slips on the turntable use a coin as indicated on the record label.

Step 2 — Record all three programs on the record on the blank cassette tape.

Step 3 — Remove the cassette and insert it into your CTR-80 cassette recorder.

Step 4 — Type "CLOAD" on your CoCo and *RUN*.

Method 2 — Stereo system with turntable only.

Step 1 — Make a patch cord to go from your stereo headphone jack to the AUX input on your CTR-80 using a 6' Extension Cord-

Miniature Phone Plug (R.S. #42-2420) and a Plug Adapter (R.S. #274-046 or R.S. #274-305). No soldering will be required. (The R.S. #42-2157 Mini Phone Plug to Stereo Phone Plug will also work.)

Step 2 — Record the record on your CTR-80.

Step 3 — Load the tape into your CoCo using "CLOAD" and then *RUN*.

### Comments

1) Do not try to input data directly from your stereo system. This could possibly damage your computer.

2) If precise recording levels can be obtained, the recording level should be 10dBm.

3) Once the program is loaded into the computer, save the data to another tape using *CSAVE* "name of program" for future use.







Shuffle MP3 hear it!

A SAMPLING  
OF PROGRAMS FROM  
THE JULY 1983 ANNIVERSARY ISSUE OF

The **RAINBOW**

FOR USE WITH THE RADIO SHACK TRS-80®  
COLOR COMPUTER.



PLACE COIN HERE IF  
33 1/3 RPM  
MONAURAL  
SOUNDSHEET SLIPS

(Refer to magazine articles for full program description. Transfer to cassette for loading.)

PROGRAMS:  
(BY FILE NAME)

1. SHUFFLE
2. MEMORY
3. HOMEBDGT

MFD. IN U.S.A. BY **EVATONE**® CLEARWATER, FL.

83115X  
**EVATONE**®  
SOUNDSHEETS

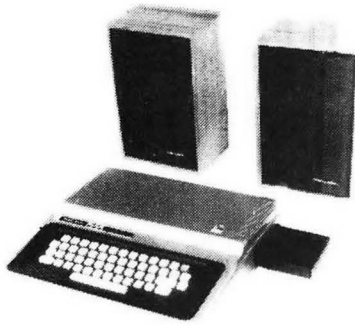


RAINBOW MAGAZINE  
2nd ANNIVERSARY ISSUE  
JULY 1983



## THE STEREO COMPOSER

NEW  
PRODUCT!



The **STEREO COMPOSER** music synthesizer was developed for the true music lover. All the features available for the **COMPOSER** described below are also available for the **STEREO COMPOSER**. However, instead of using the single 6 bit digital to analog converter built into the computer and the speaker built into your TV, the **STEREO COMPOSER** uses two 8 bit digital to analog converters which drive two audio power amplifiers. These amplifiers supply enough audio power to easily drive your own external speakers. If you like, the output may be connected to your home stereo system to further increase fidelity. Connection is provided by two phono connectors. If the music is too loud, two built-in volume controls are provided to allow you to control the volume of each of the channels separately. The advantage of being able to use external high quality speakers is obvious. The use of higher quality digital to analog converters serves to further increase music fidelity.

The **STEREO COMPOSER** produces music in stereo. Of the 4 voices produced, 2 are directed to each channel. This ability alone increases the realism of the music. You can even move the voices between speakers as the music plays.

The **STEREO COMPOSER** comes assembled, tested, burned in, with all the software and hardware to allow you to immediately start enjoying your music. A complete manual and examples are provided to give you everything you need to know.

The **STEREO COMPOSER** is completely memory decoded so it does not conflict with the Radio Shack disk controller. In this way, disk owners with an expansion interface such as the BT-1000 by Basic Technology can produce music from disk with the **STEREO COMPOSER** in one slot and the disk controller in another. In fact, you can even have **THE VOICE** in another slot without any fears that there will be memory conflicts.

Requires Extended BASIC and Minimum of 16K  
Specify Cassette or Disk

STEREO COMPOSER (Hardware and Software) .....\$119.95



## THE COMPOSER



The **COMPOSER** is a 4 voice music compiler which easily allows one to develop high quality music. Each voice is programmed separately. In addition, each voice uses its own waveshape table which means a unique sound for each of the 4 voices.

The **COMPOSER** features a 7 octave range. It supports dotted and double dotted notes as well as eighth, quarter, and standard triplet notes. Sixteenth and thirty second notes are also supported.

The **COMPOSER** allows the music to be played at any tempo and in any key. And believe it or not, the tempo and key can be modified as the music plays. This gives the user tremendous versatility in developing music. Key modification also allows the user to move the music up or down one or more octaves.

The **COMPOSER** displays a constantly changing random kaleidoscope pattern as the music plays. In addition, the number of the note being played is displayed which aids one in finding sour notes during music development. Both of these displays can be disabled to allow any screen to be displayed while the music is playing. In this way, one can show the words to a song or display a picture as the music plays.

The **COMPOSER** develops a machine language position independent sub-routine that can be Saved, Loaded, and Executed independent of all other software. This means that you can share your music with friends. In fact, you can write your own BASIC programs that call and play the music. Software vendors may include the music in their own product.

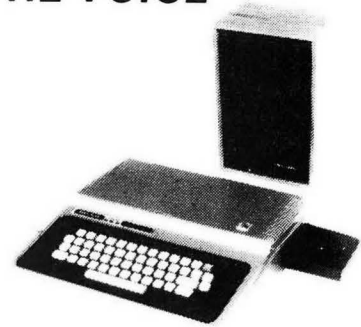
The **COMPOSER** is menu driven making it extremely easy and friendly to use and operate. A thick operating manual is also provided. Many examples are given to aid the user in getting started. All you need is provided, no additional hardware is necessary. Don't let the price fool you, the **COMPOSER** has got to be heard to be appreciated.

Requires Extended BASIC and Minimum of 16K

CASSETTE VERSION .....\$24.95  
DISK VERSION (32K) .....\$29.95

## THE VOICE

NEW  
PRODUCT!



**SPEECH SYSTEMS** got its start providing high quality speech synthesizers for SS-50 bus computers. We are now proud to announce the same high quality product for the Color Computer and TDP-100.

**THE VOICE** should not be mistaken with software speech synthesizers which require the computer to do all the work in producing speech.

**THE VOICE** uses a special large scale integrated circuit, the SC-01 by VOTRAX, to reproduce any one of 64 phonemes at 4 inflections. Phonemes are basic units of speech which allow one to reproduce any word in English as well as many other languages.

**THE VOICE** has two outputs. Speech may be heard through the user's TV speaker, or the built-in audio power amplifier may be connected to your own external speaker. A phono connector is provided for this purpose and if the volume is too high, a built-in volume control may be used to adjust it to the proper level.

**THE VOICE** comes assembled, tested, burned in, with all the necessary hardware and software. A complete manual with many examples are provided to get you started in developing your own BASIC or machine language programs to use speech.

**THE VOICE** is completely memory decoded so it does not conflict with the Radio Shack disk controller. In this way, disk owners with an expansion interface such as the BT-1000 by Basic Technology can produce speech from disk with **THE VOICE** in one slot and the disk controller in another. In fact, you can even have the **STEREO COMPOSER** in another slot without any fears that there will be memory conflicts.

We are trying to develop a library of software for **THE VOICE**. Toward this end, we will be offering substantial royalties to software authors for their work.

Requires Extended BASIC and Minimum of 16K  
Specify Cassette or Disk

THE VOICE (Hardware and Software) .....\$179.95

## HOW TO ORDER

We accept CASH, CHECK, COD, VISA, and MASTER CARD orders.

Shipping and handling for all products in the continental US and Canada .....\$2.00

Shipping and handling for all products outside the continental US and Canada .....\$5.00

COD charge (requires cash, certified check, or money order) .....\$2.00

Illinois residents purchasing the **STEREO COMPOSER** or **THE VOICE** please add 5 1/4% sales tax.

Dealer Inquiries Invited

SPECIALISTS IN SYNTHESIZERS  
FOR THE COLOR COMPUTER AND TDP-100.

# Speech Systems

38W255 DEERPATH ROAD  
BATAVIA, ILLINOIS 60510

(312) 879-6880

CALL ANY DAY, ANYTIME TO ORDER. YOU MAY ALSO ORDER BY MAIL.



# Learning Through Program Dissection

By Joseph Kolar  
Rainbow Contributing Editor

You've come a long way! It is time to introduce you to program analysis.

There comes a time, which you may have reached, when things begin to fall into place. You know the rudiments of BASIC and have spent a lot of time at the keyboard. You are beginning to get the feel of computing. It is all starting to make sense. But, not quite!

There are some things that remain hazy. Things you don't grasp. You understand the program "in toto," but not every line. In fact, a few lines may not ring a bell at all.

Dredge up the *3CRAPS* program listing from our June installment. It will be used as the example to demonstrate one way to analyze a program. This will be a learning experience, and in a sense you will become an author.

A notebook, similar to the reference notebooks you created, will be used. Do not number the pages. Using a black, felt-tipped pen, on a well-centered, gummed label, print "program analysis." On the inside cover, about two inches from the top, draw about five horizontal lines. Print "contents" neatly, above the top line. Between the two top lines you drew, print neatly, "3CRAPS," or some title that is meaningful to you.

On the top line of the first page, print in red ink, "analysis of 3CRAPS." Skip a line. In black ink, print in paragraph form, a summary of the program. Use your own words and add anything you discover as you analyze the program.

An example: "This is an attempt to analyze, by dissecting line by line, a home-made 3 crap dice game taken from *the Rainbow*, June 1983."

Remember, when you analyze a program, no permanent modifications, revisions or improvements are made. This is a no-no!

*CLOAD* and *RUN* the program. Look it over carefully and compare it with your listing. Then, *LIST* it in increments, (list-100; list 100-200) and try to figure out the purpose of each line. Keep your program in memory. You may want to run the program or just a part of it to verify how a line reads and what it does.

Note: You can run a program from a selected point by "*RUN* 130-" to begin at line 130. Try it and see what happens. *RUN* 140- to *RUN* 170-. Notice the different results you get. Some lines may give a UL error. Try to figure out why.

Good starting or insertion points are at *CLS*, *PRINT* or *REM* lines. They will carry the program forward to a logical stop, *INPUT* or press *ENTER*, awaiting some information necessary to continue. If none is demanded, the program will run to the end. These are good entry points to check out certain parts of a program.

Suppose you wanted to check out line 220 in action. Line 220 states that if the total of the three dice is four you will *GOTO* line 570, which, after a short pause, will tell you on a blue background the bad news that you lost. You might have to wait all day for a four to be cast. One way to overcome this would be to inject the desired result, "4," by changing lines: 140 B=1; 150 A=1; 160 C=2. Another way: change line 170 R=4 which ignores the results of lines 140-160. There are other ways to achieve the desired result. Can you work out

## PEACOCK ENTERPRISES

WE'RE PROUD

CMAILIST IS A GREAT ADVENTURE -  
BUT NOT AN ADVENTURE GAME!

An Address Book, Phone Book, Mail Label Generator  
and a whole lot more.

CMAILIST is a powerful and professional MINI-DATA-BASE for home or office use. CREATE, ADD, DELETE, CHANGE, INSPECT, SEARCH, SORT, MAILING LABELS, TICKER FILE, and INVOICE all so easily, you'll wonder why you waited so long!

Up to 500 RECORDS containing 10 FIELDS can be stored per file  
(memory and system dependent).

CMAILIST is available in the following versions:

- 4.0 Cassette Systems (specify 16K or 32K) \$19.95
- 5.0 Disk Systems \$24.95
- 5.1 2 Drive Disk Systems with INVOICing \$29.95

CMAILIST includes an easy to follow Comprehensive Manual  
& 1 year warranty.

SO JOIN THE GREATEST ADVENTURE OF ALL-YOU WILL BE A  
WINNER!

C.ITOH ProWriters ~~\$495~~ Parallel \$565 serial

395

SEND FOR FREE CATALOG!

Prices Include Shipping! COD Accepted on Software only!  
Send check or money orders to:

PEACOCK ENT.  
194 CANNONGATE III ROAD  
NASHUA, NH 03063  
603-880-8169 Mon-Sat 10-10

(Joseph Kolar is a free-lance writer and programmer dedicated to proselytizing for computers in general, and the CoCo specifically.)



# “WANNA FIND OUT WHAT FUN REALLY IS?”

THE KIND OF EXCITEMENT YOU GET OUT OF YOUR SYSTEM DEPENDS ON  
WHAT GAMES YOU PUT INTO IT.

If You Want to Find Out What it's Like to Use your Computer to its Fullest...Then These are the Games  
You'll Need! FOR YOUR TRS-80 COLOR COMPUTER

## Dunkey Munkey

32K EXTENDED BASIC NOT REQUIRED



ON THIS SCREEN:  
Pop the Rivets and Fight Fires



ON THIS SCREEN:  
Jump Barrels and Ride the Elevator

We're sure you already know the rules to this game! As game progresses so does the difficulty level.

Cassette ..... \$24.95  
Diskette ..... \$29.95

ULTRA-FAST MACHINE LANGUAGE ■ HIGH RESOLUTION GRAPHICS ■ SPECTACULAR SOUND EFFECTS

## STARFIRE

16K EXTENDED BASIC NOT REQUIRED



Plays like popular arcade game Defender™ including:

- Hyperspace
- Smart Bombs
- Radar Scanner

Cassette ..... \$21.95  
Diskette ..... \$26.95



Give your Color Computer  
a New Image!



## SCREEN - 64

64 Characters X 32 Lines  
Upper & Lower Case

16K EXTENDED BASIC NOT REQUIRED

1. Load in SCREEN-64
2. Type EXEC
3. You're Back in BASIC with a 64 x 32 Screen plus...

FEATURES:

- Slow/Fast Scroll Selectable
- Window Capabilities
- Text & Graphic on same screen
- Superscript/Subscript
- Reverse Screen/Reverse Video
- No Hardware Modification Needed

Cassette ..... \$19.95  
Diskette ..... \$24.95

Intellectronics Ltd

22 Churchill Lane  
Smithtown, N.Y. 11787  
(516) 543-6642

DEALER INQUIRIES INVITED

We pay all shipping. All orders shipped in  
24 hours. N.Y. residents please add sales  
tax. Canadian orders please send M.O. in  
U.S. funds only.

any? Of course, you must restore the original line or you will be "4'ed" to death.

If you have Extended Color BASIC, you can *TRON* your way through a program. We shall assume that you have Color BASIC only.

By now, you are hopelessly addicted to the 80C. If you have 4K, Color BASIC, I strongly urge you to have your machine upgraded to include Extended Color BASIC and 16K, in that order. You are going to do it anyway. You will be glad you did!

Back to the drawing board. After your introductory notes, skip a line. In black ink, print "10" to the left of the red, vertical line. To the right of this line, print in black ink the actual listing of line 10, up to the color (:), which separates multiple statements massed in one line. On the next line, indent about an inch and in red ink, using your own words, print an explanation of the meaning of that segment of the line: "blank out the screen." In black ink, on the next line, lined up with the black listing, print ":PRINT." Indent an inch on the next line and in red, print "skip a line."

Next line: write 20 to the left of the red, vertical line. Print the following: print "rules" to the right. Count the spaces between ("") and (R) and write the number, enclosed in a circle in the space. (Sometimes, it is easier to count them from the screen than the line listing.) On the next line, indent and in red, print: the word "rules" is centered on the screen. Do you know another way to achieve the same result? If you do, in pencil write any alternate way you have discovered to get *exactly* the same result. Try it out to be certain by

replacing line 20 in the listing and *RUN* it. Restore the original line.

Follow the same format throughout, systematically progressing from one line number to the next. Do not skip a line number. If you are uncertain of the meaning of a line, leave adequate space to put in your explanation at a later time. List multiple entries, separated by a (:) separately. The exception would be an obvious case such as *line 30 PRINT: PRINT:PRINT*. Put the entry on one line in black; indent on next line and in red print "skip three lines."

---

*"There comes a time, which you may have reached, when things begin to fall into place. You know the rudiments of BASIC and have spent a lot of time at the keyboard. You are beginning to get the feel of computing. It is all starting to make sense. But, not quite!"*

---

Drop down to line 180. It would be listed, in its turn, as described above. An explanation could be "print the results of the cast of the 'A' die at screen location 200. Verify the location by checking the print @ worksheet in the manual." If you know another way, add it in pencil. You could say: "PRINT @ 32\*6+8,A."

Drop to line 480, which would be listed in its proper turn. This line means that if you rolled a number, 2, that was not equal to the number you were supposed to roll, R, or was not a 10, then get set to make another cast. Notice how lines 480-500 give you all possible directions for any number that might be cast.

Isn't it interesting to puzzle out the significance of every line? But, what happens when you get hung up? If you can't figure it out, try different strategies. For instance, *RUN* the program from some entry point near the problem area. Delete the line or lines that bug you. See what happens. (Remember to replace the lines later.) Pass around the problem line with a *GOTO* or insert an (') at the beginning of a line to effectively bypass the line. Substitute other data. Introduce temporary markers. (Insert an \* at some point.) There are lots of things you can try to isolate the problem. *RUN* the program or part of the program, observing what changes occur, and you will get many good clues to help you solve the problem.

Finally, if all fails, leave a few lines blank for the explanation. Continue, and return to it later. This will indicate your weak areas and what you need to work on. Don't be obsessed with it. It may come to you later like a flash out of the blue.

Eventually, you will have the entire program psyched out. Good for you! Getting it down on paper helps to jog your memory.

At some time, you will come across an intriguing and more complex program listing that you will want to dissect and study. Save it for a project and when you want a change of pace, get the old notebook out and chop it up.

After you do four to six analyses, you will discover that you will begin to meaningfully read listings and give up dissecting programs. That is as it should be. In the meantime, have fun!

## OELRICH PUBLICATIONS BRINGS YOU GREAT SOFTWARE VALUES

- 1.) **ZAXXON** (by Datasoft) The official version from SEGA. Great graphics and sound! Maneuver your way through enemy planes and anti-aircraft fire to meet your date with the deadly robot ZAXXON! 32K cassette \$35.95
- 2.) **MOONSHUTTLE** (by Datasoft) Watch your screen explode with life threatening man-o-wars, meteors, bomb launchers and more! The Prince of Darkness is the enemy, so this one will take your best effort. 16K cassette \$31.00
- 3.) **3-D Tic-Tac-Toe** (by J. Makowski) It's human vs. computer in this all machine language version of a classic. Great graphics and a very strong playing program make this a bargain. 16K cassette \$16.95
- 4.) **FROG TREK** (by R. Oelrich) Use the keyboard arrows to guide your frog through rush hour traffic and across the river. All machine language code for fast play. 16K cassette \$14.95  
All prices include shipping so you save!

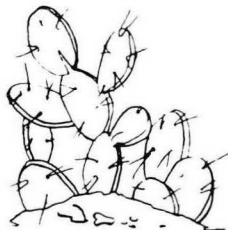
TO ORDER SEND CHECK OR M/O TO:

**OELRICH PUBLICATIONS**  
4040 NASHVILLE  
CHICAGO IL 60634

OR CALL TOLL FREE: 800-621-0105  
(in Illinois call 312-545-9286)

VISA AND MASTERCARD ACCEPTED





# PRICKLY-PEAR SOFTWARE

## QUALITY PROGRAMS FOR YOUR COCO & TDP-100

PROGRAMS REQUIRE 16K EXTENDED BASIC FOR TAPE, AND 32K DISK UNLESS OTHERWISE NOTED.



### Flight

If you'd like to fly a plane then this is what you've been waiting for. A really good graphics oriented flight simulator in high resolution. Four difficulty levels let you go from student level to a difficult instrument-only landing. In front of you on the screen are your instruments, and above them are two representations of your plane in relation to the flight path (top and side views). At the higher levels all you have to go by are the instruments. Can you put it down on the runway to hear the synthesized voice from the tower say "perfect landing"? It's tough! You use your joystick just like the control stick on a plane, and the action is realistic indeed. This program was written by a professional flyer — a pilot for a major United States air carrier, and the high standards of professionalism really show. Just CLOADM and take to the skies!! Requires 32K extended. **TAPE is \$19.95 — DISK is \$24.95**

### The Fantasy Master's Secretary

This program will be greatly appreciated by the many people trying to run a fantasy game! It's not easy to keep track of hit points, charges in magic items, monsters, game time, armor values, and a lot more, all while trying to conduct a meelee and listen to 8 people talking at once. If you ever thought you needed a secretary, this is it! It keeps track of all the above and more, and even has a help file in case you forget how to use it. It also figures the experience points of monsters while keeping an electronic eye on value and weight of treasure found. You'll truly wonder how you got along without it!!! If you quit before the campaign is completed, you can save the whole thing to tape (or disk) and take up right where you left off next time you play. At the beginning it will ask you whether or not the players can see the screen, and set its displays up accordingly. Remember, this isn't a game — it's an aid to use with a fantasy game. **\$19.95 tape — \$24.95 disk.**

### Eight-bit Bartender:

This will light up your next party! Over 100 great drink recipes are stored by the bartender and called up at your command. Ask for them by drink name, main liquor used, or class of drink (highball, cocktail, etc.). These were gathered from the favorites and house specialties at famous pubs and taverns across the US. It outputs to the screen, printer, or both! At your next party let the guests browse through the Bartender. Needs 32K. **TAPE \$19.95 — DISK \$24.95**

### Phonics I

This classroom-tested program is the newest in our Phonics series. Written by the same elementary school teacher, it takes up where PREREAD I, II, & III leave off. Actually two programs (on separate tapes), the TUTORIAL teaches all 22 of the consonant blends using on-screen graphics and voice (controlled by the computer and played through the TV speaker). The TEST program asks for the letters in these blends (again using voice through the speaker), and checks the keyboard input for the correct answer. Again, on screen graphics are used as an aid to learning, and immediate feedback to the learner is given.

### Phonics II

Similar to **Phonics I** in concept and execution, but **Phonics II** teaches consonant digraphs. Again there are two programs (on different tapes) for the TUTORIAL and TEST modes.

Both **Phonics I** and **Phonics II** are well documented, and are sold separately on **TAPES** for **\$24.95** each. They are also available as a package — only on **DISK** for **\$44.95**.

### A Partial List of Prickly-Pear Programs

Astrology, Gangbusters, Household Helper, Fantasy Gamer's Package, Viking, Football, Preread I, II & III, Mathpac I, Tarot, I Ching, Numerology, The Great Word Game, The 80C Songbook, Phonics I, Phonics 2, Flight, Las Vegas Weekend, The 8-Bit Bartender, The Fantasy Master's Secretary, Monsters & Magic, Topsy Turvy, Galactic Patrol, Blockade, Sea Wars, Jungle, Spanish . . .

FOR DISK VERSIONS ON AMDEK CARTRIDGES, ADD \$5.

Your Personal check is welcome - no delay. Include \$1.50 shipping for each program ordered. (Shipping free on \$50.00 or larger orders). Az. residents add 6% sales tax. Orders shipped within two days.

Stocked by Quality Dealers, or

Send Order To: **PRICKLY-PEAR SOFTWARE**

9234 E. 30th Street  
Tucson, Arizona 85710  
(602) 886-1505





# GETTING MORE

By Melvin Hefter

## From the Disk Directory

Most people with disk systems use the *DIR*ectory command to list the names of files on their diskette, but many may not have a good idea of what the disk directory really is and other ways it may be used. The disk directory is that information stored on the diskette which tells Disk BASIC what files are there and *where those files are located*. Disk BASIC needs this information to use these files to store programs or data.

The total disk directory is composed of a file allocation table and directory entries for each file. When you use the *DIR* command, this information is combined to tell you the name and size of each file. You can redirect this information to your printer by *POKE*ing the printer's device number (254) into location 111 before requesting the directory listing. *POKE 111,254:DIR!* will print the directory for drive 1.

Disk BASIC divides the diskette into 35 tracks. You can visualize these tracks as concentric circles. Each track is sub-divided into 18 sectors. The designation of a track and sector identifies a unique area of the disk which contains 256 bytes of information. The Disk BASIC file system groups nine of these numerically adjacent sectors into a unit called a *Granule*. There are two Granules per track. A Granule is the smallest unit that will be allocated to a file. The use of this Granule convention results in fewer disk areas for the file system to manage. There is no reason that this value had to be nine. Tandy could have decided to group six, or three, or two sectors into an allocation unit, or even allocated individual sectors. The use of a smaller allocation unit would have resulted in less disk data area being wasted, but more disk space being required for directory information and

more overhead in the allocation process. The file system uses track 17 for the directory information. This leaves 34 tracks (68 Granules) available for files. The table below shows the track/sector of the first sector of each Granule.

| Granule # | 0    | 1     | 2    | 3     | 4    | 5     | 6    | 7     | 8    | 9     |
|-----------|------|-------|------|-------|------|-------|------|-------|------|-------|
| 0         | 0/1  | 0/10  | 1/1  | 1/10  | 2/1  | 2/10  | 3/1  | 3/10  | 4/1  | 4/10  |
| 10        | 5/1  | 5/10  | 6/1  | 6/10  | 7/1  | 7/10  | 8/1  | 8/10  | 9/1  | 9/10  |
| 20        | 10/1 | 10/10 | 11/1 | 11/10 | 12/1 | 12/10 | 13/1 | 13/10 | 14/1 | 14/10 |
| 30        | 15/1 | 15/10 | 16/1 | 16/10 | 18/1 | 18/10 | 19/1 | 19/10 | 20/1 | 20/10 |
| 40        | 21/1 | 21/10 | 22/1 | 22/10 | 23/1 | 23/10 | 24/1 | 24/10 | 25/1 | 25/10 |
| 50        | 26/1 | 26/10 | 27/1 | 27/10 | 28/1 | 28/10 | 29/1 | 29/10 | 30/1 | 30/10 |
| 60        | 31/1 | 31/10 | 32/1 | 32/10 | 33/1 | 33/10 | 34/1 | 34/10 |      |       |

**Tabulation Of Track/Sector For Each Granule**

The file allocation table (which is really a Granule allocation table) is located in sector 2 of track 17. Only the first 68 bytes of this sector are used. Each byte corresponds to one Granule on the disk. The first byte will give the status of Granule 0. The 15th byte will be the status of Granule 14. If the value of the byte is 255, it means that the corresponding Granule is not in use. A byte value between 0 and 67 indicates that the corresponding Granule is in use, and the byte value is a pointer to the next Granule of the file. This means that this Granule is *not* the last Granule of the file. A value between 192 and 202 means that the corresponding Granule is the last Granule of the file and tells how many of the 9 sectors in that Granule are part of the file. The file allocation table does not provide enough information to tell where any given file begins.

Sectors 3 through 11 of track 17 contain the actual names of the files on the disk and other information including the number of the first Granule of each file. This information is referred to as the directory entry. The directory entry for

*(Mr. Hefter is president of Custom Software Engineering of Cocoa Beach, Florida)*





---

# Skyline Software

---

**PUBLISHERS OF QUALITY MICROCOMPUTER SOFTWARE**

---

**PAGE PLUS** — Attention BASIC programmers! Here is the software you've been waiting for! Up to 56K available from your BASIC programs. This utility, written by Chris Hawks, does the memory management necessary to utilize the two 32K banks of memory. Easy enough for any 'intermediate' level BASIC programmer to use. Includes documentation and demo programs to show you how to use PAGE PLUS to get the most out of your computer. Works with 64K tape or disk systems.

**Cassette \$27.95      Disk \$29.95**

**MDISK** — Hal Snyder's latest breakthrough for the 64K Color Computer! MDISK lets you use the upper 32K of memory for rapid storage and retrieval of programs and data. Whether you own an actual disk drive or not, MDISK puts the 'hidden' 32K to work for you as a 'virtual disk,' with capability to save and load up to 15 programs, view a directory of files stored in 'page 1', kill unwanted page 1 files, execute BASIC or machine language directly from MDISK, chain to a BASIC program while preserving data already created, and more. These functions are available not only under manual keyboard control, but from programs in progress as well, permitting high-speed swapping of programs or data. Unlike many 64K utilities, MDISK doesn't copy BASIC to RAM. This greatly increases the amount of workspace available to you (by 22K in a disk system). MDISK is written in position independent code, and will work on disk or tape based 64K systems. Full documentation included.

**Cassette \$27.95      Disk \$29.95**

**ROMBACK** — Why pay more? The easiest to use ROM-pak dumping utility available! At the best price, too! Comes with full documentation, including detailed patching instructions to allow several popular 'problem' cartridges to run from tape or disk. Stop plugging and unplugging your disk controller! Don't blow any more SAM chips or 6809Es! Use ROMBACK, and run those programs from tape or disk instead. Works with any 64K Extended BASIC tape or disk system.

**Cassette \$16.95**

**QUICKSORT** — A machine language sort routine specifically designed to be used by BASIC programmers. This utility will speed up those programs where a BASIC sort is just too slow. Great for mailing lists and databases. Can be incorporated into many existing programs as well. Written in position independent code, works on tape or disk systems. 16K required.

**Cassette \$12.95**

**64K BOOT/PAGER** — Two 'must have' utilities for the 64K Color Computer owner. The 64K Boot allows you to modify BASIC by moving it from ROM to RAM. The PAGER is a menu-driven utility allowing you to manually page between the 32K banks of memory, copying BASIC or data from one page to the other. The complete assembler source code for both programs is included, so you can see how it's done! Both programs are written in position independent code and run on 64K tape or disk systems.

**Cassette \$19.95**

**STRUCTURED MACROS** — An assembly language programming tool for users of the Macro-80C assembler, by the Micro Works. Structured macros come close to transforming your assembler into a high-level language. Your programs become more understandable and debugging is simplified. Commands include IF, ELS, ENDIF, IFTST, IFCC, WHILE, ENDWH, REPEAT, and UNTIL.

**Disk \$19.95**

**WIZARD'S TOMB** — A text and graphic adventure that the whole family can play! Like no other that you've played before. Up to four players can be involved in the attempt to enter the Wizard's Tomb. 16K and Extended BASIC required.

**Cassette \$12.95**

**WIZARD'S TOMB, PART II** — Takes up where Wizard's Tomb left off. Now that you've found the treasure in the Wizard's Tomb, try to find your way through the ten levels of the catacombs! Good luck—you'll need it! 32K and Extended BASIC required.

**Cassette \$15.95**

**WIZARD 64** — If you've got 64K, then this one's for you! Uses both 32K pages of memory for graphics and action — combines the features of Wizard's Tomb and Wizard's Tomb Part II into one great game. Challenging enough for adults, yet entertaining for younger players too. 64K Extended BASIC required.

**Cassette \$21.95      Disk \$23.95**

## ORDERING INFORMATION

**ALL ITEMS SHIPPED FROM STOCK**

**Phone orders may be placed at:**

**(312) 260-0929  
(Our voice line),**

**or with your computer at:**

**(312) 260-0640  
(Our MODEM line)**

**Mail orders and requests for catalogs should be sent to:**

**SOFT CITY  
442 Sunnyside  
Wheaton, IL  
60187**



**All Software Available on 3" AMDISK Cartridges — \$4 additional  
Dealer Inquiries Invited.**

each file does not tell how many Granules long that file is. This is why both the directory entry and the file allocation table are required to produce the *DIR* listing. The directory entry tells where the file begins. Counting the Granules as it traces through the file allocation table until it finds the last Granule tells how long it is. Figure 1 illustrates how this all works.

Each directory entry uses 32 bytes even though only 16 bytes contain any useful information. The first 8 bytes are the file name and the next 3 are the extension (BAS, DAT, etc.). If the first byte of the file name is zero, it means that the file has been killed. If the first byte of the name is a 255, it means that entry and all following entries have not been used—no need to look further. It is the 14th byte of each entry which tells the number of the first Granule of that file.

The disk directory is not part of any file and may not be *OPENed* or read with the *INPUT* command. Disk BASIC provides another command which will bypass the file system and allow you to directly read *any* sector of the disk. This is the *DSKI\$* command and uses as parameters the drive number, track, sector, and two string variables—one to receive the first 128 bytes of the sector and one for the last 128 bytes. (Remember that one string variable will not hold more than 255 bytes).

Now we have enough background to put that disk directory to work for us. Listing 1 shows a program which may be

which cannot be read. You can generally make this sector readable by writing over it with a *DISKOS* command. You can then use your map and the track/sector vs. Granule table to see which file (if any) has lost data. Remember to run the program (listing 2) again to confirm that the sector is readable and see if any other sectors are bad.

The directory map is also of use to show you how your diskette is organized. If you have a map of a diskette you just put into service, it will probably show the files are well organized. Files are clustered around the middle of the diskette and multi-Granule files are using adjacent areas. But a map of a diskette which has been used for a while and which has had files grow or shrink in size, files deleted (killed), and others added, shows a less organized picture. The disk system will try to allocate adjacent Granules when it can. This is more than just aesthetically pleasing. It also allows files to be read or written with a minimum of time required to reposition the read head. But if you have several files (data or program) which gradually grow over time, the allocation pattern is one of intertwined Granule allocation.

The disk system *BACKUP* capability is good for making an exact duplicate of your diskette. It makes a physical copy—that is, it copies all sectors whether used or not. The *BACKUP* process does nothing to reorganize your disk and get things back to a neat (and efficient) allocation. The disk system *COPY* command does write a file copy as if it is just being created, and in so doing keeps things together. You can create a new and well organized disk just by copying all of your old files to that new disk one by one. If you have many files on the disk, this will be a bit of a chore.

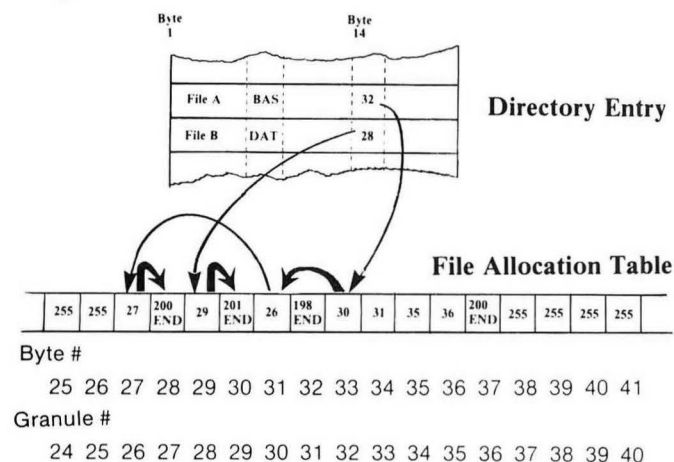
But unlike the *BACKUP* command, the *COPY* command can be used by a program. The disk manual states that the *COPY* will erase memory, but it really doesn't. What it does do is use whatever memory is not in use by your program. The more memory available, the better *COPY* will work on longer files.

Listing 3 is a program which will copy all files on a diskette in Drive 0 to Drive 1. The effect of copying all files is to produce a logical backup of your diskette. But since this new diskette will probably be better organized (more efficient) than the original, you may want to make it your new working copy and keep the original as the backup. The *COPY* command will not write over an existing file. To use this program, the new diskette must not have any files with the same name as those on the diskette to be copied. This will generally mean a newly formatted diskette.

The use of this program also has some other advantages. The program will not try to read unused sectors so an unreadable but unused sector will not be a problem. If your old diskette is only partially filled, this procedure may actually be faster than the *BACKUP* command. You may use this program to make one backup diskette combining two half-filled diskettes as long as file names do not repeat. And you may add those customizing touches like sorting the file names or copying only program files or only files which start or end with this or that. If you found a disorganized diskette with program Listing 1, try program Listing 3 on it and then get a map of the new diskette to see what neat means!

Unfortunately, Listing 3 will not work on a one-drive system. Program Listing 4 shows the modifications required for a logical backup using only one drive. This version does have many of the advantages of Listing 3, but it also has one major disadvantage. You will need to switch diskettes at least once for each file to be copied. For a single drive system, the *BACKUP* command will generally be easier and

**Figure 1**



used to get a different kind of directory listing. This program will produce a map which shows which Granules are used for each file and their order of use. This program checks the first character of the file name for 255 (line 50) to find the first unused entry (no need to read further) and checks for a zero (line 70) to see which files should be omitted from the listing. Line 80 prints the file name and extension and finds the first Granule of the file. Line 90 traces through the file allocation table until the last Granule is found. This program is written to allow you to customize it for your own use. For example, if you want the listing in alphabetical order, just add a bubble sort between line 60 and 70. Or if you want only BASIC programs listed, test for this in line 70. Try running this program on several of your diskettes.

The map produced may be of use if you have problems with your diskette. Listing 2 is a short program which may be used to read all sectors on a diskette. If you get an I/O error while trying to backup a diskette, run this short program. It will terminate with an I/O error, but the last track/sector displayed on your screen will tell you the first sector



# The PROFESSIONAL Keyboard

A direct plug-in replacement for your Color Computer.

- \*Simple Installation  
(No glueing or cutting)
- \*Redefinable keys
- \*Free Software - See page 80 of June 1983 RAINBOW
- \*No Extra Charge for TDP/F Model

**\$69.95**

"A Model 1 keyboard in a Color Computer case. This product is a real gem."  
*Rainbow Review*, March 1983  
\*All TDP/F orders please specify



"The Spectrum Switcher is a fantastic device"  
*RAINBOW* review, April, 1983, Page 207

## SPECTRUM SWITCHER

**\$99.95**



Have your Disk and Cartridge too!  
Transforms a Color Computer into a dual slot system. Comes with extender cable.



## SPECTRUM PROJECTS

93-15 86th DRIVE WOODHAVEN, NY 11421  
212-441-2807

all orders plus \$3 S/H, N.Y. residents add sales tax



faster than Listing 4 (unless you only have about half a dozen files). But you may wish to use the program when the map shows a real need for reorganization.

You will probably find these small utilities useful. But more important, the use and understanding of these programs will give you a better idea of how the file system uses the disk directory and how to make it work for you.

#### Listing 1:

```

1 'LISTING #1
2 '
3 'THIS PROGRAM IS USED TO
4 'PRODUCE FILE ALLOCATION MAP
5 '
10 PCLEAR 1: CLEAR 2000: DIM F$(72)
):DR=0 'DR IS DRIVE NUMBER
20 DSKI$ DR, 17, 2, AL$, B$
30 N=1: FOR S=3 TO 11
40 DSKI$ DR, 17, S, A$, B$: A$=A$+LEF
 T$(B$, 127): FOR J=0 TO 7
50 F$(N)=MID$(A$, J*32+1, 16): IF L
 EFT$(F$(N), 1)=CHR$(255) THEN N=N
 -1: GOTO 61
60 N=N+1: NEXT J, S
61 'BUBBLE SORT CAN GO HERE
70 FOR M=1 TO N: IF LEFT$(F$(M), 1)
)=CHR$(0) THEN 100
80 PRINT#-2: PRINT#-2, LEFT$(F$(M)
 , 11); " "; G=ASC(MID$(F$(M), 14, 1
))
90 PRINT#-2, G; "-"; G=ASC(MID$(AL
 $, G+1, 1)): IF G<68 THEN 90
100 NEXT M

```

#### Listing 2:

```

1 'LISTING #2
2 '
3 'THIS PROGRAM IS USED TO CHECK
4 'ALL SECTORS ON A DISK
5 'IF IT ENDS WITH AN I/O ERROR
6 'THE LAST TRACK/SECTOR DISPLAY
7 'IS NOT READABLE
8 '
10 PCLEAR 1: CLEAR 8000: DR=0 'DR

```

## 64K for \$99!

We will convert your Radio Shack Color Computer to a full 64K for only \$99.00 plus shipping. (Compare this with RS price of \$149 + \$30 labor for 32K upgrade.) Board models D, E and F — No matter what ROM you have — Typically 24 hour turnaround — Includes hardware modification to access the entire 64K, with special software and instructions on use of the upper 32K. Pack your computer well. Include cashiers check, money order, or personal check (allow 2 weeks for personal checks) for \$104.00 (\$99.00 + \$5.00 shipping) to PYRAMID. You may also pay by Mastercard or return COD. We will treat your computer tenderly and rush it back to you.  
 PYRAMID — 527 Hill St. - Santa Monica, CA - 90405 - (213) 399-2222

```

IS DRIVE NUMBER
20 FOR T= 0 TO 34:CLS:FOR S=1 TO
 18
30 PRINT T, S:DSKI$ DR, T, S, A$, B$:
NEXT S, T: CLEAR 2000

```

#### Listing 3:

```

1 'LISTING #3
2 '
3 'THIS PROGRAM IS USED TO
4 'MAKE A LOGICAL BACKUP FROM
5 'DRIVE 0 TO DRIVE 1
6 '
10 PCLEAR 1: CLEAR 2000: DIM F$(72)
):DR=0 'DR IS DRIVE NUMBER
30 N=1: FOR S=3 TO 11
40 DSKI$ DR, 17, S, A$, B$: A$=A$+LEF
 T$(B$, 127): FOR J=0 TO 7
50 F$(N)=MID$(A$, J*32+1, 16): IF L
 EFT$(F$(N), 1)=CHR$(255) THEN N=N
 -1: GOTO 61
60 N=N+1: NEXT J, S
61 'BUBBLE SORT CAN GO HERE
70 FOR M=1 TO N: IF LEFT$(F$(M), 1)
)=CHR$(0) THEN 100
80 W$=LEFT$(F$(M), 8)+"/"+MID$(F$
 (M), 9, 3): PRINT W$: COPY W$ TO W$+
 ": 1"
100 NEXT M

```

#### Listing 4:

```

1 'LISTING #4
2 '
3 'THIS PROGRAM IS USED TO
4 'MAKE A LOGICAL BACKUP
5 'USING ONLY DRIVE 0
6 '
10 PCLEAR 1: CLEAR 2000: DIM F$(72)
):DR=0 'DR IS DRIVE NUMBER
30 N=1: FOR S=3 TO 11
40 DSKI$ DR, 17, S, A$, B$: A$=A$+LEF
 T$(B$, 127): FOR J=0 TO 7
50 F$(N)=MID$(A$, J*32+1, 16): IF L
 EFT$(F$(N), 1)=CHR$(255) THEN N=N
 -1: GOTO 61
60 N=N+1: NEXT J, S
61 'BUBBLE SORT CAN GO HERE
70 FOR M=1 TO N: IF LEFT$(F$(M), 1)
)=CHR$(0) THEN 100
80 W$=LEFT$(F$(M), 8)+"/"+MID$(F$
 (M), 9, 3): PRINT W$: COPY W$
90 IF M<N THEN PRINT: PRINT"INSE
 R T SOURCE DISKETTE AND": INPUT"PRE
 SS ENTER"; C$
100 NEXT M

```





# SPECTRUM SPECIALS



- Rompak w/Blank PC Board .....\$9.95
- The Spectrum Remote Reset.....\$12.95
- The Colorcade w/Rapid Fire .....\$19.95
- Video Plus - Superb Video Interface\$24.95
- 16/32K Upgrade Kit - Lowest price..\$25.95
- Wico Red Ball Joystick.....\$34.95
- The Spectrum Joystick.....\$39.95
- Wico Analog Joystick.....\$49.95
- Super - Pro Keyboard.....\$69.95
- Botek Printer Interface.....\$69.95
- Convert Modem to Auto - Answer .....\$99.95
- Amdek Twin 3" Drive System.....\$599



**CALL 212-441-2807**

ALL ORDERS PLUS \$3.00 S/H  
N.Y. RESIDENTS ADD SALES TAX

**SPECTRUM PROJECTS**

93-15 86th DRIVE  
WOODHAVEN, N.Y. 11421





## GRAFPLOT: A Versatile Sophisticated Data Handler

How many of you have broken your sweet embrace with CoCo lately to maybe just lean back on an elbow and really take note of what's happening with our Color Computer? I mean, have you really noticed what's going on around you? Have you noticed the ever increasing amount of software available these days? Or is it happening so fast that the pace is just too swift to keep up with?

Consider that just a year ago the cupboard was woefully bare and comparable power cost almost three times as much, and your basic unit was a 4K machine.

Consider that when you finished your journey through the accompanying manuals and went out shopping in search of software, almost all you could find were a few game cartridges. Foggy memories? Then pull out some of your back issues of *the Rainbow* and check out the advertising. Now compare that with today's level of third party software and hardware advertising for our Color Computer. Notice anything significant? Sure the quantity has increased almost immeasurably, but look at the quality and diversity!

We're seeing more and more utilities and serious applications programs (now being called "personal productivity software" by some) almost every week. Programs which really allow you to tap CoCo's latent potential as a true computer—even within the small business.

Take for example this brand new product that came across my desk for review just recently. *GRAFPLOT* is its name, a general graphing program. Written in open BASIC, it's described as being capable of turning your Color Computer "into a sophisticated data plotter, producing professional quality graphs of any type of X-Y data" and promises that you'll never have to mess around with pencil, graph paper and ruler again. And I thought it was another program designed to print text on the graphics page before I cracked the manual!

*GRAFPLOT* is an applications program which will find itself equally useful in the home and office Color Computer—although probably more so in the latter case. And that, although not revolutionary, is progress, my friend!

So what's so great about this product? After all, you can learn how to make graphs from the computer manuals. But I guarantee you won't be able to do it nearly as well and with the diversity that *GRAFPLOT* offers. I know there's a new product out from the Fort Worth folks, but it's ROMpak based, isn't it? I find those cartridge programs so limiting for some reason.

*GRAFPLOT* comes in two versions: a cassette version for 16K machines; and a disk version for 32K machines. For the cassette version, you'll need a minimum of 16K with Extended Color BASIC and, naturally, a good cassette recorder. For the disk version you need 32K Disk Extended Color BASIC with one or more drives. Optional equipment requirements to get hardcopy printouts of your graphs are listed as a Line Printer VII or DMP-100 and the Radio Shack screenprint program. (There is a section in the manual on how to interface other screenprint routines and printers with *GRAFPLOT*.)

Well, I found and blew the dust off my long unused copy of the screenprint program with a sigh of relief. But since changing over to the faster, smarter and much neater Okidata 82A, I had passed my LP VII along to my computer engineering daughter. All I could do was cross my toes in hopes of discovering that the Oki' would work out. (It went crazy when I tried to get a screen print!)

After carefully reading through the documentation's 34 pages, it was time to tackle the program. Unfortunately, I couldn't think of anything I wanted to plot out on a graph at the time! Wouldn't you know it? Well, anyway, the manual includes an extensive tutorial section with a set of basic data provided to permit you to initiate a number of graphs and even includes printouts of what they should look like. Why not use these data, I said to myself.

Following the manual's instructions to clear the machine for all available memory (aimed at the 16K user), I loaded in the first cassette program and started following the step by step tutorial. Once I had entered the data and checked it, I simply called for the graph to be drawn on the high resolution screen. I was both surprised and pleased at the results. Looking good, CoCo! The screen presentation, using PMODE 4, was clear and very crisp indeed. Even though the steps taken to get that display were at first kind of confusing, I quickly got used to it, thanks to the meticulous "handholding" documentation.

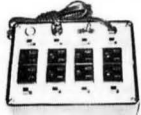
After discovering that the Okidata 82A wouldn't respond to the screenprint program (I should have known better), I "borrowed" and hooked up the LP VII and soon produced my first hardcopy printout. The image produced by the LP VII left much to be desired in my opinion: too small (3" h x 4¼" w) and kind of jagged. Maybe the latter is a result of a

### POWER LINE PROBLEMS?



### SPIKE-SPIKER® ...THE SOLUTION!

Protects, organizes, controls computers & sensitive, high tech electronic equipment. Helps prevent software "glitches", unexplained memory loss, and equipment damage. Absorbs damaging voltage spikes & surges, reduce costly equipment downtime. Filter models attenuate conducted RF interference. 120V, 15 Amps. Other models available. Ask for free literature for detailed specs. Call your order in today!



#### DELUXE POWER CONSOLE \$79.95

Transient absorber, dual 5-stage filter. 8 individually switched sockets, fused, main switch, and lite.

#### QUAD-II \$59.95

Transient absorber. Dual 3-stage filter. 4 sockets, lite.

#### QUAD-I \$49.95

Transient absorber, 4 sockets, lite.

#### MINI-II \$44.95

Transient absorber, 3-stage filter, 2 sockets, lite.

#### MINI-I \$34.95

Transient absorber, 2 sockets, lite.



Use your credit card or send check & we pay the shipping.

215-837-0700

Out of state, order toll free

800-523-9685 • TWX 510-651-2101

**KALGLO®**

6584 Ruch Rd., Dept. RB  
Bethlehem, PA 18017

PA Res. add 6% sales tax • for COD add \$3.00 + shipping • dealers invited



# BASIC AID

**AT LAST!** Help for the BASIC programmer. **BASIC AID** is an indispensable addition to the Color Computer. It will save you valuable time and effort. If you write or modify BASIC programs, you need **BASIC AID**.

You get **43** Common BASIC commands available as single Control Key inputs. Greatly speeds up program entry.

A powerful feature is the ability to **redefine** any or all of the keys to your own specifications **PLUS** you get invaluable features such as a **MERGE** command, **Move Line** command and **Automatic Line Numbering**.

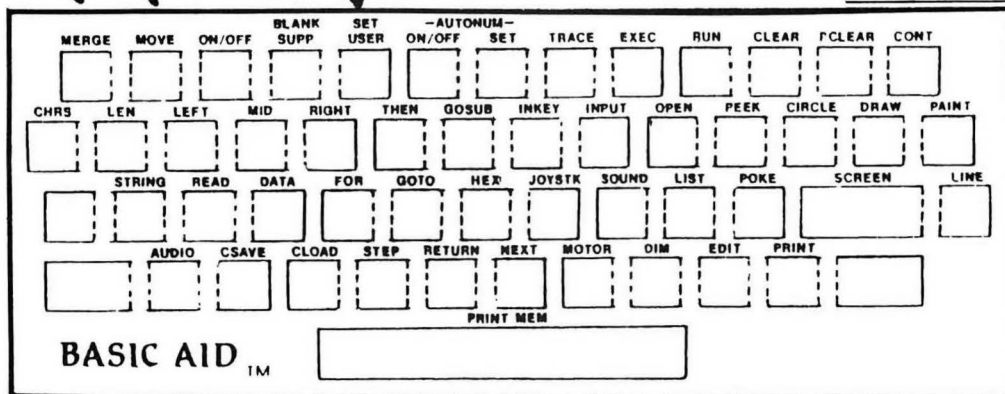
**MERGE**— Insert programs stored on cassette into your Basic program. You can even assign new line numbers to the program you read in. Great for creating your own tape library.

**MOVE**— Lets you move and renumber any part of your Basic program. GOTOS and GOSUBs are automatically changed.

**Redefine** any or all keys! Put in **your** most frequently used commands. Then save them to tape for use another time.



"An **excellent** program and **fine** utility." — **RAINBOW** review, August, 1982, Page 27



All of this in a convenient **ROM** cartridge which is available instantly on power-up. And, it uses almost none of your valuable **memory**. Comes with a convenient, easy to remove, **plastic** keyboard overlay.

**Disk Basic Aid \$49.95**

- \*Full Screen Editing
- \*Cross Reference
- \*Automatic Line Numbering
- \*Automatic Key Repeat
- \*2 Key Entry of Basic Keywords
- \*User Definable Keys
- \*Label Support



**BASIC AID CARTRIDGE**

**\$34.95**

Add \$3 Shipping and Handling

**SPECTRUM PROJECTS**

93-15 86th DRIVE  
WOODHAVEN, N.Y. 11421

(212) 441-2807 (VOICE)  
(212) 441-3755 (DATA)



CHECK OUT OUR COLOR BBS' AT (212) 441-3755 & 441-3766

much-used printer head, though. I found the first prints coming out in white on black. Remembering that I could *POKE* value 255 into memory location 16303, I soon changed that to a black on white printout. (The disk version takes care of this for you by modifying the screenprint program and relocating it to high memory.)

One last word about the cassette version and we'll move on. Because *GRAFLOT* itself consists of two programs, you'll find yourself shuffling back and forth among three cassettes: the program tape, screenprint, and a data tape. You might get a bit confused at first, but it'll wear off soon, especially if you keep your work area clean and neatly organized.

The disk version is much easier to use. After the long process of backing up the master disk's two programs and then bringing the main program up, you're asked if you have a copy of the modified screenprint program on the disk. No? Then load the screenprint program into memory from cassette and within a few seconds it's modified (including getting rid of the shift/up arrow), moved to high memory and on your disk ready to work! You're advised to then make a new backup working copy of your backup.

Both versions employ extensive error trapping to guard against your bombing the program and losing your data to boot. One method used very effectively is Automatic Prompting to lead you through all of the steps necessary to enter, set up and draw a graph. You're urged to use this option every time.

I mentioned earlier that I was hard-pressed to come up with a set of statistics of my own to graph out. But suppose you're more creative than I. Just what kind of data will

*GRAFLOT* handle? Its author suggests the following applications:

**Personal:**

- \*budgets and actual expenses versus time (days, weeks, months, or years)
- \*children's growth curves (height and weight versus time)
- \*tax bracket versus income
- \*stock and investment performance versus time or interest rate

**Business:**

- \*sales charts
- \*marginal cost and marginal profit versus units produced
- \*total cost and revenue versus time
- \*performance forecasts or production, investments, et cetera

**Statistics:**

- \*scatter plotting of raw data
- \*plotting of data versus regression curves
- \*evaluation of integrals of complex equations

**Scientific and Engineering**

- \*experimental results plotting
- \*removal of noise from data
- \*data extrapolation to new experimental conditions
- \*evaluation of certain quantities by calculating the area under a curve. (I'd *never* have thought of that one! I'm usually behind the curve.)

If you can think of unique applications, you can even define your own functions with the manual and program leading you along.

Suppose you've already got some files with data you'd like graph plotted. Can you integrate them directly into *GRAFLOT*? Yes, with reservations. "*GRAFLOT* can read data from any tape or disk file that has the proper data structure." What that means is that you must use the *GRAFLOT* format in recording your data. There's a section in the manual suggesting how you can achieve this compatibility.

The documentation—let's call it a manual—isn't too badly put together. I was a little skeptical from the start about its print format of very closely spaced typewritten lines. It just seems a bit too crowded to my eyes. Maybe I'm mellowing, though, because I soon found myself able to wade through it and make some sense out of the format. It's "chock-full-o'-nuts" to make *GRAFLOT* easy to use.

Here are the basic questions (with short answers) I asked myself after running through the program several times and getting a good feel for it:

- Overall impression? — (Very impressed)
- Probable market? — (Small, small business and the naturally inquisitive)
- Easy to use? — (Very, if you follow the manual)
- Would I buy it? — (Maybe)
- Do I recommend it? — (Yes, to anyone with such a need)

I'm very impressed with *GRAFLOT*, even though it doesn't produce pie—or bargraphs. One last thing: because it uses high resolution's PMODE 4, don't expect to see dazzling colors on the screen. And if you're going to use the hardcopy printouts in business, you might want to enlarge them a bit photographically first. Whether these are shortcomings or not depends on your intended applications.

(Hawkes Research Services, 1442 Sixth Street, Berkeley, CA 94710, \$35 cassette, \$45 tape)

—Ed Lowe

**FLY the F16**



**Instrument Flight Simulator**

Variable control sensitivity for beginner or expert. Navigate a new course each flight or do aerobatics. Instrument takeoffs and landings. Get yours now to be eligible for future low cost upgrades. Specify 16K or 32K. Tape \$19.95      Disk \$21.95

**LPVII / DMP 100 Descenders**  
 Its as if your printer had built in descenders. Load, execute, and forget its there. The lowercase set: `abcdefghijklmnopqrstu`  
 16K/32K Tape or Disk \$14.95  
 Add \$1.00 Shipping on all orders.

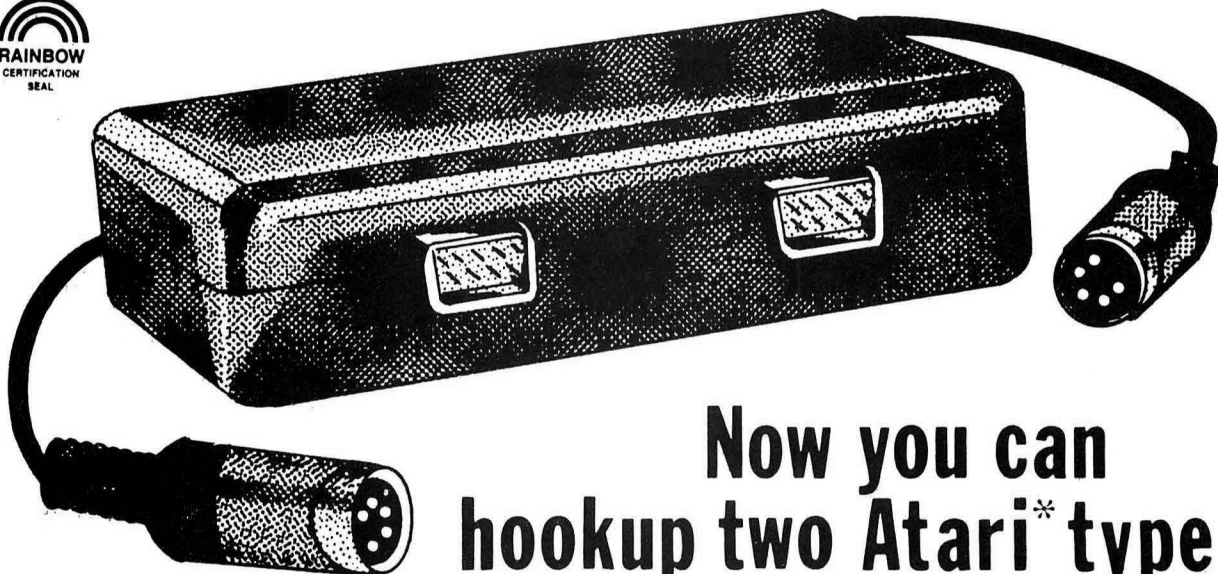
**KRT Software      813-321-2840**  
**P O Box 41395**  
**St Petersburg, FL 33743**



"BREAKING ALL SALES RECORDS"  
Bob Rosen

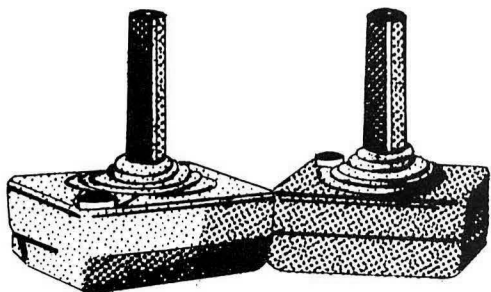
"Recommend to anyone who enjoys games on his CoCo."  
RAINBOW Review,  
March 1983

# THE DOUBLE STICK INTERFACE\*



Now you can  
hookup two Atari\* type  
joysticks to your Color Computer  
or TDP System-100 for only \$19.95

\$39.95 - The Interface with two Atari\* joysticks



\* Interface made by WICO. Atari is a registered trademark of Atari, Inc.

**YES!** PLEASE SEND:  
 INTERFACES... \$19.95  
 STICK/INTERFACE SETS... \$39.95  
all orders plus \$3 shipping

NAME \_\_\_\_\_  
ADDRESS \_\_\_\_\_  
CITY, STATE, ZIP \_\_\_\_\_

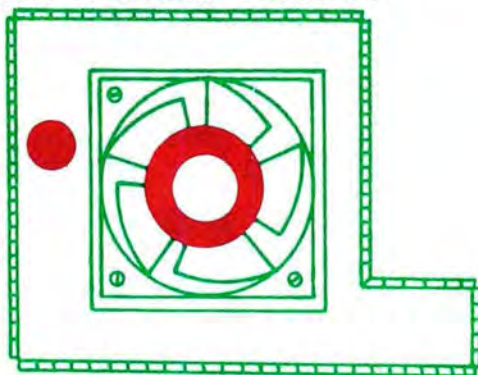
N.Y. residents add sales tax  
**SPECTRUM PROJECTS**  
93-15 86th DRIVE  
WOODHAVEN, NY 11421  
212-441-2807

# COLOR CABLES +

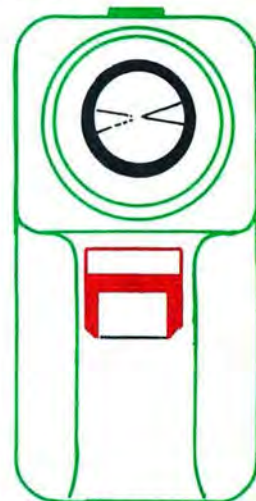
from SPECTRUM PROJECTS



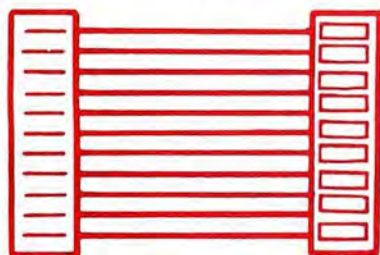
The must CoCo book for 1983. Contains a myriad of peeks and pokes, ROM and RAM upgrades, machine language backups, printer potpourri and more! Make your computer do things it never did before. ....\$14.95



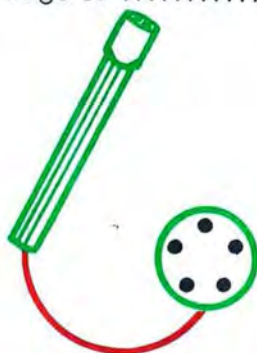
**COCO COOLER**—Internal cooling system. Prevent heat buildup inside your Color Computer. "CoCo Cooler keeps things cool."—Rainbow Review, Dec., 1982, Page 39 ..... \$49.95



**THE SPECTRUM PADDLE**—Enjoy quicker response and higher game scores. Great for games with side-to-side action like Astro Blast, Space Invaders, Shooting Gallery and Clowns and Balloons. Includes "softtouch" fire button. "You have better control of the right to left movement than with any joystick we have seen so far"—Rainbow Review, Jan., 1983, Page 134. ....\$19.95



**DISK INTERFACE/ROM PACK EXTENDER — 3 FEET.** Move your disks and ROM packs where you want them. Gold plated contacts eliminate corrosion. \$29.95



**LIGHT PEN**—Plugs right in to your joystick port and reads the colors off your screen. Includes four demo programs and is completely compatible with Computer Island's Fun-Pak software. ....\$19.95



**FOUR-PIN MALE TO FOUR PIN FEMALE—15 FEET.** Move your printer or modem to another location—easier use...\$14.95

## HIDDEN BASIC 1.0

Finally! A program written to protect your BASIC programs. HIDDEN BASIC 1.0 will modify your BASIC programs so these commands will not function:

CLOAD or CLOADM  
CSAVE or CSAVEM  
DEL or EDIT  
LIST or LLIST

The protected copy is not a BASIC program anymore. It is a special machine language program referenced by the BASIC interpreter. Once protected by HIDDEN BASIC there's no way to undo it! Tape \$19.95

Add \$3 for Shipping and Handling



**SPECTRUM PROJECTS**

93-15 86th DRIVE (212) 441-2807 (VOICE)  
WOODHAVEN, N.Y. 11421 (212) 441-3755 (DATA)

## COLOR COMPUTER EDITOR ASSEMBLER AND DEBUGGER

"CCEAD is a high quality program and excellent value. CCEAD is a tool that no assembly language programmer can afford to be without."—RAINBOW Review, February, 1983 \* \$6.95

## THE STRIPPER

Deletes REMarks, packs lines and removes blanks. "How much Memory can you save? About 25% average."—RAINBOW Review, February, 1983 \* \$7.95

\*Order both and save a buck!

Call the Rainbow Connection At (212) 441-3755 & (212) 441-3766 for Rainbow Programs & Reviews

**DEALER/CLUB INQUIRIES WELCOME**

New York State Residents add appropriate taxes





Tired of plugging and unplugging devices from the RS232 port of your Color Computer? Make your life easier. Buy our RS232 expansion cable and connect two devices at the same time. Just right for printers, modems, etc. Anything that plugs into the Color Computer will plug into this high quality cable.

RS232 Cable \$20.00  
 RS232 Switcher \$29.95\*  
 \*3 Position



**RS232 EXPANSION CABLE**

**COLORCOM/E BONUS!** Order COLORCOM/E and get the RS232 cable for only \$15.00. Save \$5.00

32K RAM Button \$2.99  
 Nanos System Reference Card \$3.99

**SPECTRUM PUTS THE SLAM ON RAM**

16K Chips \$9.95/set  
 64K Chips \$49.95/set  
 32K RAM Button \$2.99  
 Nanos System Reference Card \$3.99  
 6883 (SAM) Chip with heat sink \$29.95  
 6809E—CPU Chip \$29.95  
 Basic ROM 1.1 \$36.00  
 CoCo First Aid Kit (Be Prepared)  
 (2 6821's, 6809E & 6883) \$69.95  
 EPROM Programmer (2716, 2732, 2764  
 and 68764) \$99.95

Color Computer Tech Manual \$7.95  
 Epson Printer Interface (Serial I/O Port) \$49.95  
 Lowercase Kit — Save \$30 \$49.95  
 The Spectrum Sketchpad (Panostyk) \$79.95  
 Extended Basic ROM \$84.00  
 CoCo CoCo (24 Hour Clock) \$99.95  
 The Spectrum Control Center \$99.95  
 Color-80 BBS Software \$115.00  
 Disk Interface (Spectrum Special) \$139.95  
 "THE ANSWER"—Allows you to switch between Rom-pak and Disk. Contains a smart terminal program that allows you to print online with a 51 x 24 format. Also contains 2 parallel ports, monitor program, auto-start defeat switch and power-on indicator. \$179.95



# COLORCOM / E

## SMART TERMINAL PACKAGE

**WE DIDN'T WAIT** for the competition to catch up with us! We've added even **MORE** features to COLORCOM/E, our superb Smart Terminal program for the Color Computer. Compare before you buy. **NOBODY** offers you more!

- ★ Complete Upload and Download Support
- ★ Online Cassette/Disk Reads and Writes
- ★ 110, 300, 600, or 1200 Baud
- ★ Full or Half Duplex
- ★ Preenter Data Before Calling (Saves \$\$'s)
- ★ Offline and Online Scrolling
- ★ Automatic Capture of Files
- ★ Send All 127 ASCII Characters From Keyboard
- ★ Word Mode Eliminates split Words
- ★ 7 or 8 Data Bits (Including Graphics Support)
- ★ Efficient Data Storage S-t-r-e-t-c-h-e-s Memory
- ★ ROM Pack or Disk

**COLORCOM/E \$49.95**

**AND, our efficient storage and easy editing of received data makes printing to your printer offline a snap. Select any portion of the received data for printing. No need to print everything.**

**Add \$3 for Shipping and Handling**

**TAPE UTILITY** by Thomas Oikarinen



**64 DISK UTILITY PACKAGE**

1. **40K** — Tired of seeing 22823?
2. **ROMCRACK** - Now place your ROMPAC Software on Oisk!
3. **Software Print Spooler** — Tired of waiting for your printer? Output data to a RAM buffer and go back to programming! Now works with LPVIII (600 Baud or better) Price—\$21.95 40K on Tape—\$9.95



**SPECTRUM PROJECTS**

93-15 68th DRIVE (212) 441-2807 (VOICE)  
 WOODHAVEN, N.Y. 11421 (212) 441-3755 (DATA)

A powerful program that permits the user to easily maintain, backup, and catalog both tape and disk programs.

1. TDR—Tape directory
2. COP—Tape to tape copy
3. PTD—List tape directory to printer
4. DIR—Directory of disk
5. PDR—Print disk directory
6. DIT—Copy file from disk to tape
7. TTD—Copy file from tape to disk
8. BAC—\*\*Auto disk to tape backup\*\*!  
 Cassette or Disk — \$24.95

Call the Rainbow Connection At (212) 441-3755 & (212) 441-3766 for Rainbow Programs & Reviews

**DEALER/CLUB INQUIRIES WELCOME**  
 New York State Residents add appropriate taxes



# PIPELINE



**YOU'VE BEEN READING ABOUT** the "new" Color Computers on these pages for some time — now we're going to tell you something about one of them.

Yes, it is available. It is called the MC-10 and has the now-familiar CoCo logo of red, green and blue rectangles on its white cover (see the picture on this page). Not only is the "PoCo CoCo" (poco means small in Spanish) available now, but it is available for \$119.95. That's a very competitive price and when we tell you more about it, you'll see that it looks like the people at Radio Shack have come up with another winner.

From the standpoint of the CoCo Community, the advent of the TRS-80 MC-10 means that there will be a whole lot of people joining us! Here's an ideal "first" computer at a "first computer price." And, while the initial version comes with just 4K, there is reference to greater memory availability and some interesting possibilities for expansion.

The instruction set for PoCo CoCo is something of a mixture of Color BASIC and Extended Color BASIC. And while there are no high-res commands, it seems obvious that high resolution graphics will be possible with machine language programs.

PoCo CoCo arrived here just as we were on deadline, so there may be number of details we will be forced to leave out of this first look-see. But, Dan Downard, our technical editor, promises a full run-down on PoCo CoCo for next

month.

In the meantime, here are some first impressions:

The MC-10 has all the string functions available for CoCo, many of the trig operations (like COSine and SINE) and a good amount of other goodies such as RND, ABS, CHR\$ and the like. It also has PEEK and POKE, which the non-Extended BASIC CoCo did not originally have.

Along the same vein, it also has multi-dimension array capabilities, which were not included with non-Extended. And, surprise, it sends information to the printer by LPRINT—not PRINT #-2, as does CoCo. This may cause some compatibility problems, but shouldn't be too serious.

Then there's something new: CLOAD\* and CSAVE\*. These two commands allow you to save and load *arrays* to tape without affecting the rest of the program. A nice addition!

Also obviously different is the keyboard, which sports automatic key-in of BASIC keywords by using a "control" key. Also, the block graphic symbols can be accessed directly from the keyboard.

PoCo CoCo uses a Motorola 6803 microprocessor. This is in the same "family" as CoCo's 6809, but it is not exactly the same. It does use the same PIA chip, so the display looks virtually the same as does its big brother's. All the

chips we saw were soldered to the motherboard inside — meaning no sockets as with CoCo. What there is, though, is an "expansion edge card slot" in the back. The manual says this is for extra memory, but Joe Bennett of JARB Software/Hardware says he believes all the address busses come out through this port — which means a lot of things could be added there.

We have to wonder whether they *will* be, though. We see PoCo CoCo as an ideal beginner's machine that will help a person "graduate" to either CoCo or the "Super CoCo" that rumors say will be introduced by Radio Shack some time in the future. In fact, if you read *the Pipeline* last month, you would have seen reference to the computer we are now describing and to the "Super CoCo" we're talking about now.

Also, PoCo CoCo has a full-blown RS-232 serial port and the standard cassette port. It, like CoCo, can run on either channel 3 or 4 and does come with the TV connection box (and appropriate cable) at no extra charge.

At first blush, PoCo CoCo looks to be very similar, technical-wise, to CoCo. The text screen starts at a different place and the top of BASIC is located at a different place in memory. But, these are about the same, so there will have to be some more experimenting before we can be sure whether programs will run "as-is."

There are some differences in the I/O routines, too. For instance, PoCo CoCo does not appear to use the remote control for the tape recorder motor. Also, there may be some differences in BASIC tokens — but programs *typed in* will run the same. New tapes may have to be made to handle programs on that medium. Stay tuned.

All in all, we feel it very reasonable to say that PoCo CoCo is a good addition to the Color Computer family. We believe it will interest thousands and thousands of people in computing — and at a price more attractive than CoCo itself. Once these people get their feet wet in computing, the natural "up-grade" will be to CoCo (or "Super CoCo").

In comparing PoCo CoCo to the other computers in its price range, it definitely comes out far ahead. While Motorola's 6803 is not quite as spiffy as 6809, it is a fine step up from what other low end computers are using. Too, the command set is excellent and the variety of applications seems to be good. And, we *do* hear a memory upgrade will be on its way soon.



# Spectrum Projects

Your TDP-100 Dealer

## Trims Down Prices!

**64K TDP-100  
with Ext/Basic**

**\$\$ Call \$\$**

**Line Printer I  
(DMP-100)**

**\$299.95**

**Color Drive  
Zero**

**\$449.95**

**DC Modem I  
Communications**

**\$129.95**

**Color Cassette  
Recorder (CCR 81)**

**\$49.95**

**16K TDP-100  
with Ext/Basic**

**\$\$ CALL \$\$**

**CALL 212-441-2807**

all orders plus \$3.00 S/H  
N.Y. residents add sales tax

**SPECTRUM PROJECTS**

93-15 86th DRIVE  
WOODHAVEN, NY 11421

**LAST CHANCE AT THESE LOW PRICES**



## DATAMAIL Flexible, Needs Slight U.S. Modification

Oh #0#%\$0! What did I do with that address? Fret no more. Your answer lies in CoCo. That is, of course, if you have *DATAMAIL*.

Upon getting *DATAMAIL* to review, I quickly leafed through the short documentation and *CLOADED* the tape. When CoCo gave me the proverbial OK I simply entered RUN and was greeted with a complete menu which clearly depicted what this program would do for me. A very nice touch.

*DATAMAIL* allows you to save complete addresses, easily edit them as required, and print them using any of three selectable formats. Name, address, and phone numbers are stored. You can find addresses automatically by typing in a name or semi-automatically using an up/down scan feature.

To use *DATAMAIL* you need the renowned CoCo 16K Extended, a cassette to save your addresses, and a printer is not necessary (you can use the screen listing) but awfully handy.

*DATAMAIL* is flexible. You can print part of the list, all of the list, a certain address, customize in which you can select which part of an address you want printed, and it has a label feature so you can print labels. For the latter, my better half has great plans. I imagine CoCo will be completely exhausted as we mail out our Christmas cards.

A little more about flexibility. *DATAMAIL* is written in BASIC which makes it easy to modify. If you have read my previous reviews you already know I am very big on custom-

izing any programs I buy and if they are in BASIC, it's that much easier.

*DATAMAIL* is fast enough to work on my printer and should suit anybody's full speed ahead requests. The only disadvantage I found was we hackers have to key in the addresses (but, we only have to do it once). Come on, you elusive voice recognition software people, get to work. Our tired digits need you!

One of the two changes I could suggest for *DATAMAIL* is a different program for people who live in the United States. They do, in their documentation, tell you how to change the program and it is a very small change. You see, *DATAMAIL* comes from a Canadian company and Canada does not have states or zip codes. They have provinces and postal codes. These two changes are easily made and saved in your customized version of the program. The second change would be an option to print multiple copies of one address for labels. I make my own return address labels and printing them one at a time is a waste of time and energy.

The bottom line must always be—should you buy it? Let us try a short program to give us the answer (be forewarned, you may get a syntax error).

```

10 IF you would like to maintain a mailing list AND
 need the flexibility DATAMAIL allows THEN
 GOSUB to the parenthetical data and let
 PRICE=$14.95 ELSE GOTO 40.
20 IF you can afford PRICE then GOTO 30 ELSE
 GOTO 40.
30 GOTO the advertisement and order DATAMAIL.
40 END: REM Whatever your decision I leave it
 exclusively in your hands.

```

(THE DATAMAN, Box 431, Sta. B, Hamilton, Ontario,  
Canada L8L 7W2, \$14.95)

—Herbert B. Ridge

# ACS

All Color Software

Post Office Box 15235  
Plantation, Florida  
33318

New! from ACS . . .

Give your CoCo an  
On/Off light for \$5.00!!  
Will NOT Void Warranty!



Now for only \$5 you can have an on/off light for your CoCo, without voiding your warranty!! If you own a joystick, can drill ONE hole, and make TWO connections, then you are ready for this simple Do-It-Yourself Kit!!

This simple kit comes with the parts to modify 2 joysticks, and clearly written instructions on the procedure, which takes only 10 minutes on the average.

Note: This modification Does NOT impede joystick performance. This kit works with any joystick, and is equally easy to install in each.

**ORDER NOW!!**

**NO Extra Shipping Charges!!**

Florida residents add 5% sales tax. Note: Custom joysticks still available.



## *Fraction Math Quiz* Has Multiple Defects

Computer owners who are actively involved in education, whether as teachers or parents, seek software which will enhance and extend classroom activities. All too often the "educational programs" are mere drills, which do not utilize the computer's capabilities.

*Fraction Math Quiz* is another drill program. It presents a menu of choices for seven fraction operations, including fractions to decimals, at five levels of difficulty for each operation. The answers are given in multiple choice format, (which is the best feature of the program) for many students are able to work problems exactly, yet fail to see that something like  $13/16$  is approximately  $3/4$ . This program provides plenty of practice in "smart guessing," partially intended by the author, but also because the levels of difficulty are not properly thought out. For example, in doing addition, Level I consists of problems which share a common denominator, yet Level II, where the denominators should be in the range of 2 to 6, presents problems of the type  $4/9 + 11/14$ . Because the program is written in BASIC it would be easy to change so that the difficulty levels correspond to actual classroom practice.

The menu contains an eighth choice, "Play Starship Commander." That sounds enticing, doesn't it? Who, on loading in the program, would make any other choice? Unfortunately, when this option is selected, a message appears saying you are in the galaxy and must return to your home planet without the aid of your computer, and will have to calculate the course yourself. You are then returned to the

original menu. So sure was I that the author had inadvertently omitted the game that I called to check. I am sorry to say that this message and the return to the menu for the review constitutes the intended diversion. It is against all principles of education to raise someone's hopes for a reward, and then not deliver. This leads me to believe that the program was not child tested before release. My testers (ages 9 to adult) suggest that the whole drill be made into a starship game. The present scoreboard which shows the number right on the first try could be retained.

Unfortunately, the program as it stands is only a drill. No child of my acquaintance has the motivation, persistence, and patience to sit at the computer and perform such drills when the only reward is a simple "Right on, Alfred" for a correct response. In our house, the children were willing to go through the program only because they knew they were participating in a review, and could make suggestions for improvement.

Should you need a drill program for your child, and find the multiple choice format desirable, you should provide the motivation and reward which the program lacks. You could merge a game into it, as the program occupies less than 8K, and this game could be played after a certain number of correct responses and then return from the game to the drill.

For a high school student or adult who is already highly motivated to improve basic fraction skills, and for whom the improvement would be sufficient reward, the advanced levels are a real challenge and definitely improve the ability to approximate answers.

(Creative Technical Consultants, P.O. Box 652, Cedar Crest, NM 87008, \$14.95 including s/h)

—Carol Kueppers

## ARE YOUR WALKING FINGERS GETTING FOOTSORE ?

Tired of typing in those long, but wonderful, programs from each issue of **the RAINBOW**? Now, you can get **RAINBOW ON TAPE** and give those tired fingers a rest. With **RAINBOW ON TAPE**, you'll be able to spend your time enjoying programs instead of just typing...typing...typing them! All you need to do ever again is pop a **RAINBOW ON TAPE** cassette into your recorder, CLOAD and RUN any one you want.

**RAINBOW ON TAPE** is available as a single issue for \$6.50 or on a yearly subscription basis for only \$60. It is the perfect complement for **the RAINBOW** itself.

VISA, MasterCard and American Express accepted. All subscriptions begin with the current issue and back issues are available beginning with April, 1982. Subscriptions are sent first class mail to coincide with the arrival of your current issue of **the RAINBOW**.

Now . . .

### The Best Color Computer Magazine Offers The Best Tape Service

Think of it! Not 10 or a dozen—but between 20 and 30—programs every month from **Rainbow On Tape**. All the really good programs from **the Rainbow**! All the long ones . . . so you don't have to type them in. Just CLOAD and RUN!

**ORDER RAINBOW ON TAPE TODAY!**  
**HANDY ORDER CARD BETWEEN PAGES 34 and 35**

# CIRCLES AND ARCS

16K  
ECB

By Don Inman  
Rainbow Contributing Editor

A point located on a circle can be referenced in terms of Cartesian coordinates (X,Y) or by Polar coordinates (R,ANG). Since most microcomputers screen displays

radius angle

are described in Cartesian coordinates (even though the Y axis is upside-down from the normal notation), a few conversions are necessary when you wish to use Polar coordinates.

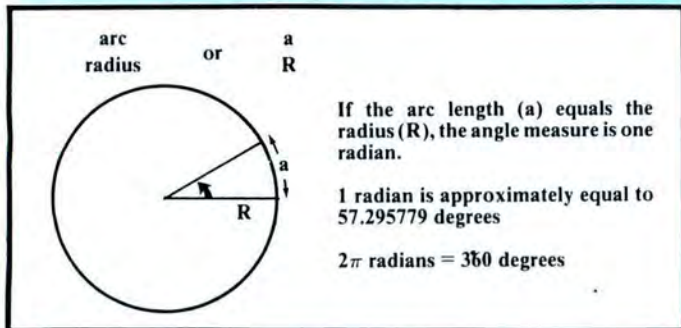
$$\text{ANGR} = \text{ANGD} / 57.295779$$

in radians in degrees

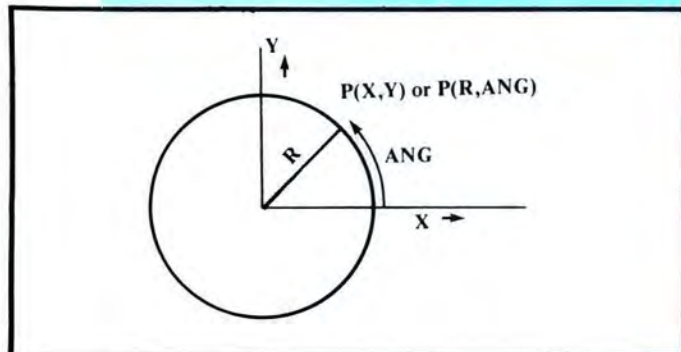
$$X = R * \text{COS}(\text{ANGR})$$

$$Y = R * \text{SIN}(\text{ANGR})$$

For those who are rusty in mathematics, a radian measure is the ratio of the arc that the angle subtends to the radius of the circle in which it is the central angle.

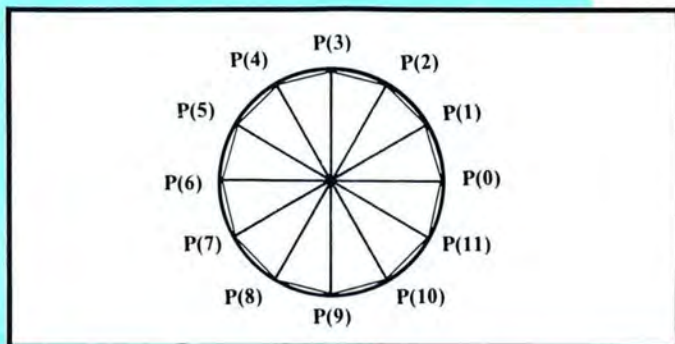


If you know the radius of a circle and a given central angle, the X and Y Cartesian coordinate locations of a point (P), relative to the circle's center, can be calculated with the conversion formulas given above.



The Color Computer has a wonderful BASIC statement, *CIRCLE*, that takes all the work out of plotting a circle. The *CIRCLE* statement can even be modified for height to width ratio (a circle's eccentricity) to produce an ellipse. In this article, we will analyze the circle in order to find out how we can produce more complex curves.

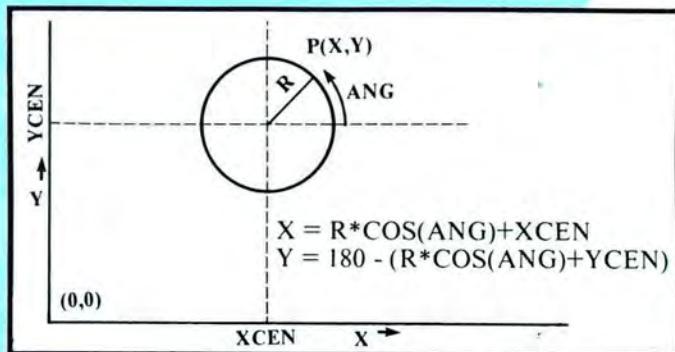
A circle can be thought of as a series of connected straight lines of the same length. At each end of the straight lines is a point. These points are determined by the radius of the circle and the size of the angle used to divide the circle (the central angle). For example, look at a circle with radius R and ANG = 30 degrees.



A simple *FOR-NEXT* loop can be used to calculate the X,Y coordinates for the end points.

```
FOR ANG = 0 TO 360 STEP INC
 X = R * COS(ANG) : Y = R * SIN(ANG)
NEXT ANG
```

Of course, the X and Y values must be adjusted for the distance of the circle's center from the origin of the axes on which they are plotted. The Y value must be corrected for the computer's Y orientation.





Our program will be general enough to provide for plotting arcs (sections of circles) as well as complete circles. The parameters used in the program are:

XCEN = X coordinate of the circle's center  
 YCEN = Y coordinate of the circle's center  
 R = radius of the circle  
 SAN = starting angle (in degrees)  
 EAN = ending angle (in degrees)  
 INC = angle increment (in degrees)

The main program accepts the inputs, defines the parameters, sets up the graphics screen, calls the plotting subroutine, and provides INKEY\$ statements for terminating the graphics screen when desired.

The listing:

```

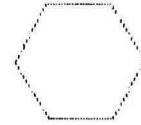
100 REM ** CIRCLES AND ARCS **
110 '
120 REM ** INPUTS **
130 CLS
140 INPUT "STARTING ANGLE (DEG)"
;SAN
150 INPUT "ENDING ANGLE (DEG)";E
AN
160 INPUT "INCREMENT (DEG)";INC
170 INPUT "RADIUS";R
180 INPUT "CENTER X,Y";XCEN,YCEN
190 '
199 REM ** SET GRAPHICS **
200 ! 4,1
210 !1
220 ! 1,0
230 ! 0,1
240 '
299 REM ** CONVERT AND GO PLOT *
*
300 PL=INC/57.295779
310 EAN=EAN-INC
320 !(0,180)-(250,180),!
330 !(0,180)-(0,0),!
340 GOSUB 2000
399 REM ** HOLD IMAGE **
400 A$=""
410 A$=INKEY$: IF A$="" THEN 410
ELSE 130
420 END
430 '
1990 REM ** CALCULATE AND PLOT *
*
2000 FOR N=SAN TO EAN STEP INC
2010 ANG=N/57.295779
2020 X=R*!(ANG)+XCEN
2030 Y=180-(R*SIN(ANG)+YCEN)*.8
2040 XX=R*!(ANG+PL)+XCEN
2050 YY=180-(R*SIN(ANG+PL)+YCEN)
*.8
2060 !(X,Y)-(XX,YY),!
2070 NEXT N
2080 RETURN

```

Here are screen dumps made from several runs of the *CIRCLE* program.

## RESULTS

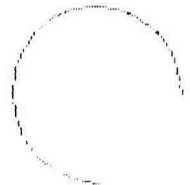
## INPUTS



SAN = 0  
 EAN = 360  
 INC = 60  
 R = 30  
 X,Y = 128,96



SAN = 0  
 EAN = 360  
 INC = 30  
 R = 30  
 X,Y = 64,45



SAN = 0  
 EAN = 270  
 INC = 15  
 R = 40  
 X,Y = 192,135



SAN = 90  
 EAN = 180  
 INC = 15  
 R = 40  
 X,Y = 64,135

## UTILITIES AND GAMES FOR THE COLOR COMPUTER

**BACKUP** .....\$9.95  
Speed up disk backups, helps to recover crashed disks. Bypass I/O errors and fix many disk problems.

**CATALOG** .....\$9.95  
An automatic disk file cataloging system. File the directories of your disks.

**COPYTAPE** .....\$9.95  
Copy, merge, and backup your tape based software. Works even with most popular pre-loader tapes.

**CZAP** .....\$9.95  
A disk inspect and modify routine. Learn how disks work, fix problems on your disks.

**CCRPM** .....\$12.95  
A disk drive speed checking routine. Displays on your screen the current, average, high, and low speeds of your drive. Complete with instructions for correcting the speed of your disk drive.

**NEATDIR** .....\$6.95  
Places the file names of your disk directory into alphabetical order. Makes finding programs on your disks easy. Keeps your disks in order.

**OFFLOAD** .....\$9.95  
Create tape backups of your disks. A disk to tape, tape to disk backup system.

**ONERR** .....\$12.95  
An error handler for BASIC programs. Allows your program to receive control whenever any error occurs. Take control and fix your problems.

**TAPEDIR** .....\$9.95  
Create a directory of your tapes. Lists program name, length of program, start, end, and transfer addresses for all programs on your tapes.

**TAPELIB** .....\$12.95  
A BASIC tape subroutine append routine and a starter library of 5 subroutines. Create your own subroutine library on tape to append to your programs.

**TAPEXFER** .....\$9.95  
Load your tape programs to disk automatically. Great for Chromasette subscribers, automatically loads an entire issue to disk.

**TREK80C** .....\$14.95  
The classic Star Trek computer game. A real time game with moving Klingons and action graphics.

Please add \$1.00 shipping and handling on all orders. Pa. residents add 6% sales tax. Canada orders must be paid in American funds. No COD or charge cards, send check or money order only to:

**A.M. HEARN SOFTWARE**  
602 S. 48th Street  
Philadelphia, Pa. 19143

Write for a free catalog of these and other products.  
Dealer inquiries invited.

When I made the screen dumps to my printer, the drawings were stretched in the X direction. The program includes a factor of 0.8 to correct for the way the screen stretches things in the Y direction. Therefore, I have found it convenient to include stretch factors as inputs for both X and Y. Then I can control whether I want a good appearance on the screen or on the screen dump. The variables XST and YST are used. For a normal appearance on the video screen, I use XST = 1, YST = 0.8. For a good appearance from the printer, I use XST = 0.8, YST = 1.

The inputs are added to the input section of the *CIRCLE* program.

183 INPUT "Y-STRETCH"; XST

186 INPUT "Y-STRETCH"; YST

Lines 2020 through 2050 are changed to:

2020 X=(R\*COS(ANG)+XCEN)\*XST

2030 Y=180-(R\*SIN(ANG)+YCEN)\*YST

2040 XX=(R\*COS(ANG+PL)+XCEN)\*XST

2050 YY=180-(R\*SIN(ANG+PL)+YCEN)\*YST

These optional inputs allow you to stretch the circle in both directions so that it is quite easy to draw an ellipse of your choice.

### Typical Screen Dumps

INPUTS for all three dumps:

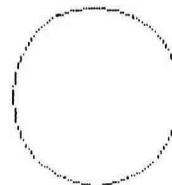
SAN = 0

EAN = 360

INC = 15

R = 40

X,Y = 128,96



XST = .8

YST = 1



XST = 1

YST = .5

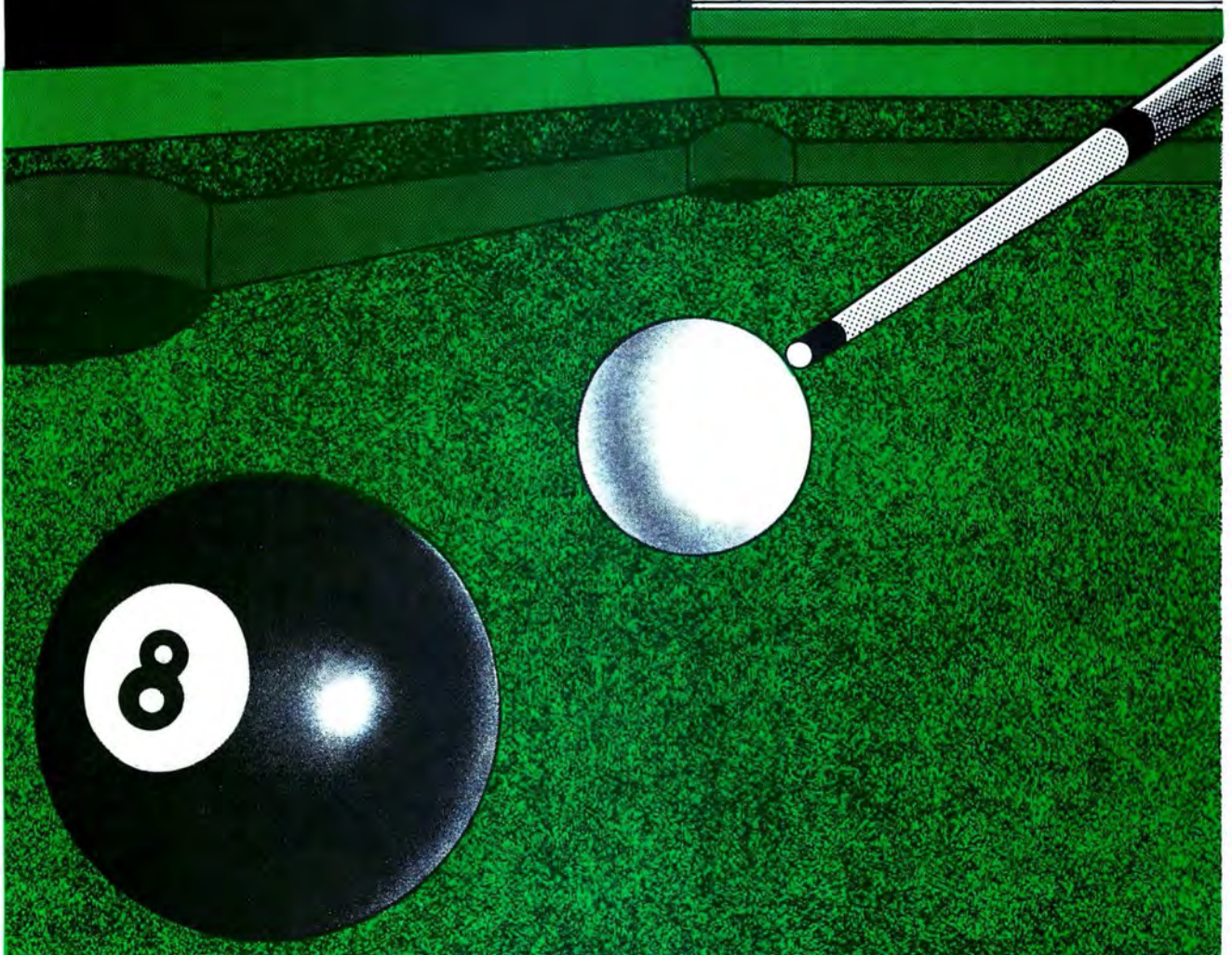


XST = .5

YST = 1



**ANTECO**  
SOFTWARE



**REALISTIC ACTION FEATURING---** Bank Shots, Combinations, English on the Cue Ball. can be played by 1 or 2 players. Ask your friend to chalk up, the action is fast. Now at your Software Dealer, if not have them call

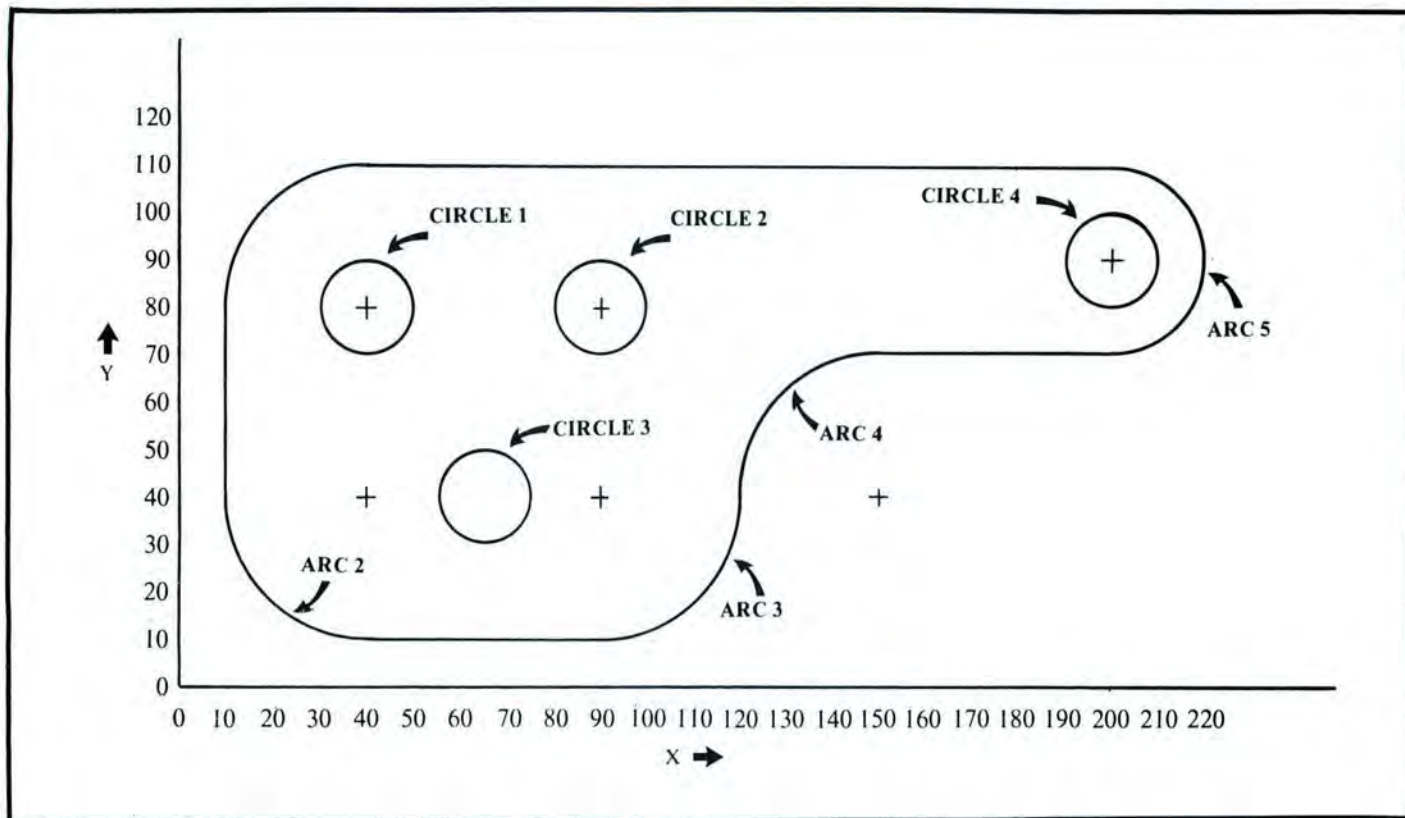
**ANTECO** 4220 Clay Ave.  
Fort Worth, Texas 76117  
1-800-433-7631

**ANTECO**  
division of  
Antenna Electronics Co.



The program *WIDGET* shows an application of the subroutine used in the *CIRCLE* program. Suppose you want to generate a computer drawing of a widget which will eventu-

ally be machined, stamped, or produced in some other way. You can use the subroutine in *CIRCLE* but re-write the main program. Our widget will look like this.



You can see that there are four circles and five arcs to draw. *WIDGET* draws the arcs first, then the circles, and finally the straight lines. Try *WIDGET*. Then change the main program to draw the design of your choice.

*WIDGET* is divided into four modules:

- 1) The *SCREEN* module clears the text screen. It then sets up *PMODE4* with a green background and black foreground. It also draws the X,Y axes.
- 2) The *DRAW* module uses a *FOR-NEXT* loop to read in the data necessary to draw the arcs and circles. It calls the *CALCULATE AND PLOT* subroutine to do the drawing. After all arcs and circles have been drawn, the straight line portions of the drawing are made. The *DATA* is then restored, and *INKEY\$* waits for a re-run if desired.
- 3) The *DATA* module contains the starting angle (*SAN*), ending angle (*EAN*), angle increment (*INC*), radius (*R*), and the X,Y coordinates of the center of the circle (*XCEN* and *YCEN*).

- 4) The *CALCULATE AND PLOT* module is the same subroutine used in the first *CIRCLE* program.

#### The listing:

```

100 REM ** CIRCLES AND ARCS **
110 '
120 REM ** INPUTS **
130 CLS
140 INPUT "STARTING ANGLE (DEG) "
;SAN
150 INPUT "ENDING ANGLE (DEG) ";E
AN
160 INPUT "INCREMENT (DEG) ";INC
170 INPUT "RADIUS";R
180 INPUT "CENTER X, Y";XCEN, YCEN

```

## AUDIO AND VIDEO INTERFACE

Provides SWITCHED color or monochrome 75ohm, 1 volt p-p video from CoCo.

If you wish to use a high resolution monitor this interface is a must.

Separate enhancements are provided for color and monochrome outputs.

This is not a simple emitter-follower add-on.

- \*UNIT DOES NOT REQUIRE SOLDERING
- \*INTERFACE IS ASSEMBLED AND TESTED
- \*400mw AUDIO @ 8 ohms
- \*TWO YEAR WARRANTY

Price \$49.95 (Includes Shipping)

**FREELAND ENG.**

7503 N. Kerby, Portland, OR 97217



# Color Computer News

\$2.95

Special "Birthday Issue"  
Having trouble getting a copy of Color Computer News at your newsstand?

Let us bring the newsstand to you!

For \$2.95 and the coupon below you can have a chance to examine the latest copy of Color Computer News. Or, if you have already had a chance to examine Color Computer News and would like to subscribe, fill out the subscription form and you will receive one full year of informative, educational and recreational information.

## SAMPLE COUPON

REMarkable Software, Inc. Kelly Software Dist.  
P.O. Box 1192 P.O. Box 11932  
Muskegon, MI 49443 Edmonton, Alberta T5J 3L1  
(616) 728-9100 CANADA

Canadian subscription  
Color Computer News only

The 12 issue subscription rate is:

|               |         |
|---------------|---------|
| United States | \$21.00 |
| Canada/Mexico | \$38.00 |
| Foreign       | \$66.00 |

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_

Enclose \$2.95 and send to: \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_

Zip: \_\_\_\_\_

This coupon begins with the latest issue of Color Computer News only.

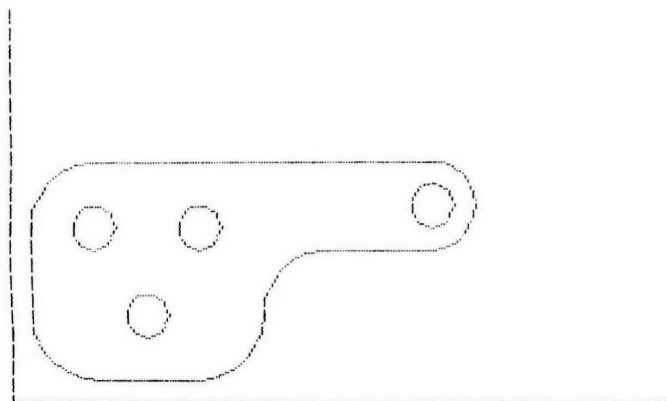


```

183 INPUT "X-STRETCH";XST
186 INPUT "Y-STRETCH";YST
190 '
199 REM ** SET GRAPHICS **
200 PMODE 4,1
210 PCLS1
220 SCREEN 1,0
230 COLOR 0,1
240 '
299 REM ** CONVERT AND GO PLOT *
*
300 PL=INC/57.295779
303 XCEN=XCEN/XST
306 YCEN=YCEN/YST
310 EAN=EAN-INC
320 LINE(0,180)-(250,180),PSET
330 LINE(0,180)-(0,0),PSET
340 GOSUB 2000
399 REM ** HOLD IMAGE **
400 A$=""
410 A$=INKEY$: IF A$="" THEN 410
ELSE 130
420 END
430 '
1990 REM ** CALCULATE AND PLOT *
*
2000 FOR N=SAN TO EAN STEP INC
2010 ANG=N/57.295779
2020 X=(R*COS(ANG)+XCEN)*XST
2030 Y=180-(R*SIN(ANG)+YCEN)*YST
2040 XX=(R*COS(ANG+PL)+XCEN)*XST
2050 YY=180-(R*SIN(ANG+PL)+YCEN)
*YST
2060 LINE(X,Y)-(XX,YY),PSET
2070 NEXT N
2080 RETURN

```

#### SCREEN DUMP OF WIDGET



```

100 REM ** WIDGET **
110 '
120 REM ** SCREEN **
130 CLS: PMODE 4,1: PCLS 1
140 SCREEN 1,0: COLOR 0,1
150 LINE(0,180)-(250,180),PSET
160 LINE(0,180)-(0,0),PSET

```

```

170 '
180 REM ** DRAW **
190 FOR ARC = 1 TO 9
200 READ SAN,EAN,INC,R,XCEN,YCEN
210 PL = INC/57.295779
220 EAN = EAN-INC
230 GOSUB 2000
240 NEXT ARC
250 DRAW"BM10,148U32BU24BR30R160
"
260 DRAW"BD32L50BL60BD48L50"
270 A$="": RESTORE
280 A$=INKEY$: IF A$="" THEN 270
ELSE 130
290 END
291 '
299 REM ** DATA **
300 DATA 90,180,15,30,40,80,180,
270,15,30,40,40
310 DATA 270,360,15,30,90,40,180
,90,-15,30,150,40
320 DATA 270,450,15,20,200,90,0,
360,15,10,40,80
330 DATA 0,360,15,10,90,80,0,360
,15,10,65,40
340 DATA 0,360,15,10,200,90
1990 REM ** CALCULATE AND PLOT *
*
2000 FOR N=SAN TO EAN STEP INC
2010 ANG=N/57.295779
2020 X=R*COS(ANG)+XCEN
2030 Y=180-(R*SIN(ANG)+YCEN)*.8
2040 XX=R*COS(ANG+PL)+XCEN
2050 YY=180-(R*SIN(ANG+PL)+YCEN)
*.8
2060 LINE(X,Y)-(XX,YY),PSET
2070 NEXT N
2080 RETURN

```

Hint...

### Finding ML Addresses

You can find the addresses of a machine language program in memory by PEEKing several addresses. Those addresses are:

To find the start address, use the command PEEK(487)\*256 + PEEK(488)

To find the end address, use the command PEEK(126)\*256 + PEEK(127)-1

To find the execute address, use PEEK(157) \* 256 + PEEK(158)

With all these commands, you must ask CoCo to PRINT the addresses as well as work out the formula. A simple way to do this is add a question mark (?) before each of the commands.

These commands can be used either in a program or in direct mode from the keyboard.



# WE DO BASIC BETTER!

## Experience High Resolution Graphics and Speed Unsurpassed in Color Computer Extended Basic Software

### GALLOPING GAMBLERS

Those who have tried it agree that *GALLOPING GAMBLERS* is so addictive, so exciting, that you and your whole family will sit cheering for your horse to win.

No joysticks are required for this 4 player game. Place your bets on the variable odds and then wait for the sound of post time...and...they're off.

Game includes color graphics with score and bird's-eye view of the race track. Can you last all twelve races?

We dare you to try.

\$18.95

### GATOR ZONE-

Is the first video computer game that takes a "byte" out of the Preppy craze! You can finally get even with those peaty Ivy League snobs by blasting away at a host of Preppy Gators on their home planet of "Preptune". You have to be quick, or the gators will gobble up your shirts! This is comic arcade fun at its best. Includes high-resolution graphics, on-screen scoring, joystick action, and three levels of play. An IMB original!

\$18.95

### STAR SIEGE PLUS-

Discussed with Space Battle games in which your space craft looks like an asterisk?

*STAR SIEGE* lets you and your friend (or enemy) pilot two high resolution space ships while trading laser blasts. The first to take ten hits loses, but watch out for that peaty alien saucer! He wants to see to it that you both get vaporized.

Also includes two player *TANK TORCHER* game.

\$18.95

### METEOR STORM-

If you are bored with space obstacle games that place you as a distant observer from a point far off in space, then *METEOR STORM* is for you. Enjoy the thrill of blasting the approaching meteors from the cockpit of your own spacecraft. Watch the meteors grow in size until...!

16K Color Extended Required. Includes sound enhanced laser blasts, multi game scoring, and three levels of play.

\$12.95

### SELECT-A-GAME-

combines 3 of IMB's finest bonus games in one simple load! You can switch back and forth from "ALPINE ALIENS", "OH, GOBI!", and "ZELDA'S BAT BOTTLE". All contain stunning color graphics and high speed action. Even if you already own one or more of these games, you will want this fine package.

\$18.95

### MICRO-MATH SKILLS QUIZ-

is a fine math drill for students at or below the 3rd grade math level. Includes automatic grade tally, and INKEY entry with large print, high-resolution graphics. This is a must for educators!

\$12.95

### CREATAVADER-

Now you can design your own "Invader-style" game for your Color Computer. Includes all the routines needed for customizing the creatures you hate the most. Full instructions included. Create your own targets or select from a menu of seven predesigned four color targets.

\$18.95

### COLOR WORDCLONE-

Turn your Color Computer into a supertypewriter. Screen displays 50 characters by 23 lines in real upper and lowercase. User modifiable. Remove our character generator and use it in your own basic program. This is an easy to use word processor. The character generator alone is worth the price of the tape. Works with tape or disk.

\$18.95

### KOSMIC KAMIKAZE-

Our best selling high-resolution, deep space arcade game which the RAINBOW called "...the best spaceship graphics we have seen in a non-machine language program." Battle high speed alien saucers, decoy ships, bonus killer crafts and speeding comets.

\$18.95

ADVANCED

### STAR\*TRENCH WARFARE-

This High Resolution Color Game has the most elaborate graphics of any Color Computer Game created to date. You'll be amazed by the remarkable speed and flicker-free animation found in this graphic space challenge. Program includes a moving trench, cockpit perspective, on-screen rapid scoring, energy and ship gauges, automatic high score tally, joystick control, and a recharge and crash sequence you'll have to see to believe. Use your own 3-D glasses and add an amazing sense of depth to this classic game. Truly a must for every Color Computer.

\$18.95



### STARBASE ATTACK-

Why be a loser? Here's an arcade game you can play to win. In other space city defense games you play until you lose. *STARBASE ATTACK* is totally different. Your mission is to clear a path for the escape vehicles which will carry your people to safety. Not only that, but you must also maneuver your own escape before alien warheads or a wave of killer asteroids level your dome-covered cities. You control high energy laser blasts and expansion shields, but watch out! You might end up the one who doesn't escape.

\$12.95

SUPER DISC WITH ALL 11 PROGRAMS  
A VALUE OF \$171.50 JUST \$59.95 POST. PAID.



ILLUSTRATED MEMORY BANKS  
P.O. BOX 289  
WILLIAMSTOWN, MA 01267

• VISA AND MASTERCARD ACCEPTED •  
CALL (413) 663-9648 3-7 PM. EST.



MENTION THE RAINBOW AND SELECT ONE FREE PROGRAM FOR EVERY TWO \$18.95 PROGRAMS YOU ORDER.



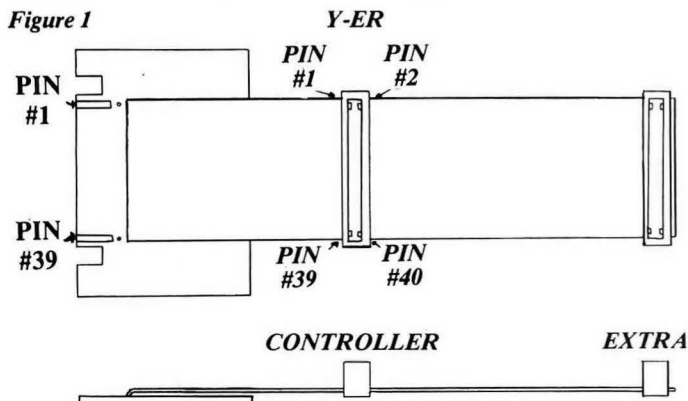




ribbon cable. And that's it—one hour later, you'll have your very own Y-er.

Okay, let's start. Take the project board and cut it in half, at about the "20" mark. You will need the half with the lower numbers. The other half may be used in a later project, but for now, put it aside. With a sharp knife, separate one end of the ribbon wire into individual wires about one inch long. Strip about 3/16 inch of insulation off of each wire. Tin each wire with solder. This is where the tricky part starts. This has to be done just right. Hold up the ribbon wire by the stripped end and let the rest of the wire hang down. Starting from the right hand side, bend the ends of the wire alternately forward and backward. The first one on the right side goes away from you. This divides the ribbon into two sections. Counting from right to left, the odd numbers are away from you and the even numbers are close to you. The top section and the bottom section. The top section will solder to the top (component side) of the project board and the bottom will solder to the bottom (copper side). You do this by soldering the bottom side first. The first wire on the right goes into the hole just below the first finger on the right. That means that it will solder to the copper side. The second wire goes on the first finger on the component side directly above the first wire. Then the third wire goes under the second finger to the finger on the copper side. The fourth wire goes on top of the second finger and so forth until all of the wires are done. The last wire on the left goes on the top (component) side of the last finger. From now on this is known as the top side. The first finger on the right side is pin #1, the pin directly underneath is pin #2, the last finger on the top side is pin #39 and the pin under that is pin #40.

Now, it's time to put the connectors on. Slip one connector into the other end of the ribbon wire. The connector should be pointing upwards, in the same direction as the top of the project board. Place the connector about two inches away from the edge of the project board. Examine the connector and wire carefully and make sure that all the wires line up with the teeth of the connector. You might have to stretch and tug the wire into place. Gently pinch the connector together between two fingers. The teeth should start to press against the wire. Again check that all the teeth align with the wires. When they do, sandwich the connector in between two small pieces of wood. Put the wood and the connector into a vise. Turn the vise until the connector is completely closed. Examine the connector to be sure that it is properly closed. If not, then give it another shot on the vise. It is important that the connector be fully closed. Now, slip in the second connector. It should stay close to the end of the wire. Crimp it like you did the first. If you think that you cannot properly crimp the connector, local electronics shop personnel might be able to help you.



Your "Y-er" should now look like the one in Figure 1. Before you go plugging this thing in, you should run a few tests. The first test is to determine if all the wires have continuity. This is where the other half of the project board comes in. Plug the board into one of the connectors. With an OHM meter, check that all the wires show continuity between the two ends. Make sure that they all line up! Pin #1 on one should be pin #1 on the other. That is important: reversed wires can cause a disaster. Next check the continuity of the other connector. If all is well there is one more thing to check before you can use the "Y-er." You must check for shorts between the pins. Put one lead of the OHM meter on pin #1. Place the other lead on each of the surrounding pins one at a time. All of the readings should show high. There should not be any resistance between any pins. After all this checks out, remove the flux left behind when you soldered the wires to the project board. This can be done with flux cleaner. If you don't have any, an old toothbrush and lighter fluid will work. You might have to get down to a little bit of scrubbing. If you bought the Radio Shack connectors you will have to do a little trimming in order for the disk controller to fit in correctly. A small knife will do the trick. Cut deep enough that the controller fits in all the way.

After you feel sure beyond the shadow of a doubt that there are no shorts and no opens it's time to try it out. With the power off, plug the "Y-er" into the Color Computer's cartridge slot. Make sure it is in tight. Turn the computer on. If all is well, then turn it off again and plug the controller into the first connector. Turn it on and there you are, you have access to the bus with the controller plugged in. Right now you don't have anything to try it out with, but next month my project is a parallel printer port. For now try plugging the controller into the other connector to make sure that it works.

SOME OF THE PROGRAMS THAT MADE Mr. R's THE SOFTWARE LEADER FOR THE IM-1/IM-2 ARE NOW AVAILABLE FOR THE COLOR COMPUTER, 16K, EXT BASIC. PROGRAMS LIKE

## MURDER

ENTER THE MANSION AND FIND OUT WHO KILLED MRS MCDERMITT. CATCH THE CAT & SLAY THE KILLER, YOU SEE THEY ALL MOVE IN THIS CLUE TYPE THRILLER. IT'S A CHALLENGING, REALISTIC WHO DONE IT ??? 14.95

FOR EDUCATION TRY

## JAIL

AN EXCELLENT TOOL TO ENHANCE SPELLING ABILITY, FOR ALL AGES. NOT A 'HANGMAN' TYPE PROGRAM, BUT A USER CONTROLLED, 2 PROGRAM TAPE.

1. CREATE YOUR OWN WORD LIST (YOU CONTROL THE DEGREE OF DIFICULTY AND AGE LEVEL).
2. JAIL - YOUR LIST IS READ INTO THE PROGRAM & THE FUN/LEARNING BEGINS. ONE OR TWO PLAYERS COMPETE IN A SPELLING OR PHRASE CONTEST AND THE LOSER GOES TO JAIL. 16.95

(CREATE TAPES OF VARYING DIFICULTY FOR EACH GRADE)

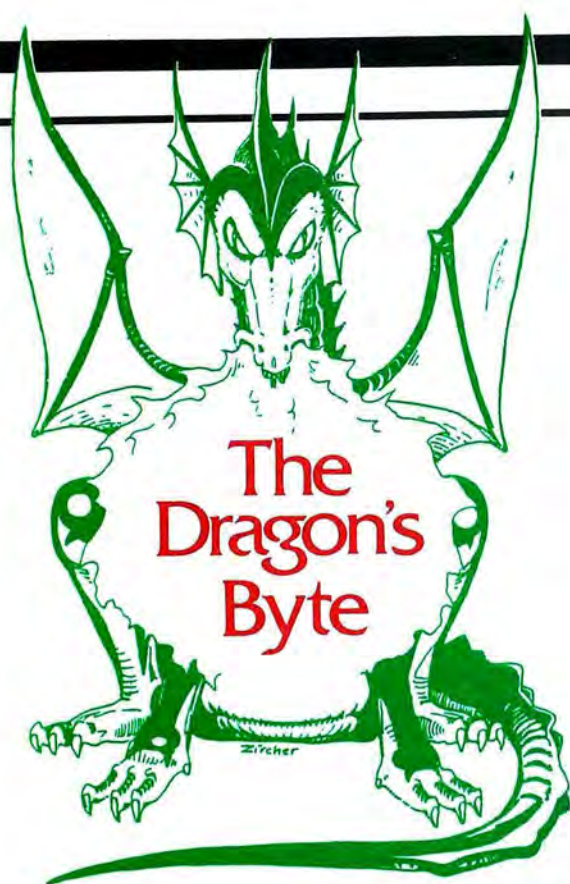
## 2FER

1. GONDOLA - PILOT YOUR BALLOON OVER THE MOUNTAIN & LAND SAFELY AMONGST THE TREES. WIND, GRAVITY & MOTHER NATURE ARE FACTORS TO CONSIDER. THIS ONE LOOKS EASY, TRY IT ?
2. COPY CAT - MATCH THE COMPUTER IN THIS SIMON TYPE GAME, IF YOU CAN. 2FER 9.95

ALL PROGRAMS ON CASSETT / WE PAY THE POSTAGE

|                     |               |
|---------------------|---------------|
| COD (ADD \$2)       | Mr. R's       |
| COD or MONEY ORDER  | 68 KELLY ROAD |
| FOR 24 HOUR SERVICE | SO WINDSOR CT |
| TEL 203-644-1817    | 06074         |





## Ready For Combat? Draw Your Crossbows!



By Bill Nolan  
Rainbow Contributing Editor

**W**elcome to the Dragon's Byte! In past columns we have talked about creating characters and monsters for fantasy games. We have also spent some time on record keeping systems for keeping track of the progress of a character.

For those of you who are not familiar with fantasy role playing games, the play consists of creating an imaginary character and then pretending to be that character while exploring old dungeons, fighting with monsters, or traveling to distant lands where strange and wonderful things can be found. You could compare it to writing a play by giving each actor a character to work with and letting them make up the dialog as they went along.

Needless to say, a game of this kind can be very complex. One of these games has five hard cover books of rules to explain the play, and the rules still fall short of fully explaining every possible situation. To handle this kind of problem, and also to have someone available to act out the parts of all the bad guys and monsters, a special game position was created.

This special person is called the dungeon master, referee, or game master, and they keep track of where everyone is, how they are doing, and myriad other facts and figures. Several of our previous articles have been addressed to the need to computerize all that data.

This time I want to begin discussing combat. In a fantasy game combat comes up like this:

PLAYER ONE: "I open up the door and go into the room."

---

*(Bill Nolan is co-owner of Prickly-Pear Software, and teaches Programming in BASIC at Pima College in Tucson, Arizona.)*

REFEREE: "O.K., there is a huge cavern on the other side, and you see a large red dragon!"

PLAYER ONE: "I draw my sword 'firedrake slayer' and move to the attack."

PLAYER TWO: "While Elrond runs to attack, I fire off a bolt from my crossbow at the dragon! Did I hit him?"

Ah, there is the problem! "Did I hit him?" That seems like an easy enough question, but consider the possibilities. First, was a shot actually fired at all? Maybe the dragon was lying in wait and knew the players were coming. Maybe our players were so surprised they dropped their sword or bow on the floor in excitement. After all, you don't open a door and find a dragon every day. Then again, maybe the dragon was faster than the intrepid fighters. Maybe the dragon let off a gout of flaming breath as the players were getting out their weapons and cooked them on the spot. Fighting dragons is dangerous work, you know!

And even if the shot was fired, it may have missed the dragon altogether, or it may have bounced off the armored scales. Who can tell? Who will decide? If we let the referee decide, then we have no game at all. We may as well just have the dungeon master tell us how everything will come out right at the start, and then we won't need to play! Think of the time we can save!

To get around this difficulty, the fantasy games have developed combat systems. These systems attempt to take into account as many of the factors in a combat as possible, and they all use dice rolls to settle the outcome. Most of these systems are very complex and consume a lot of time. A combat that would take five minutes in real time may take 45 minutes of time in a game.

Let's go through the above dialogue again, and





# INTERNATIONAL SOFTWARE INC.

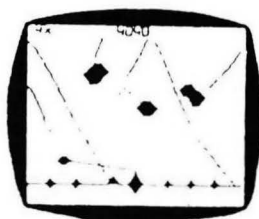
(604) 474 2271

771 HOCKLEY AVE, VICTORIA, B.C. V9B 2V5

TOP STIX, IS A JOYSTICK INTERFACE FOR THE COLOR COMPUTER, IT WILL ALLOW YOU TO USE THE FAMOUS ATARI JOYSTICK AND EVEN DATASOFT'S LESTICK, THE TOP STIX WORKS ON MOST PROGRAMS BUT NOT ALL, GET THE FEEL OF ARCADE FUN ORDER YOURS NOW \$29.95



**GHOST GOBLER**  
\$27.95



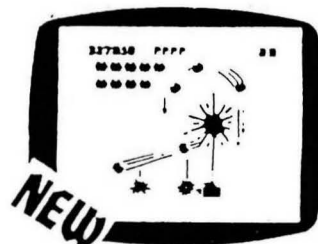
**DEFENSE**  
\$27.95

TO ORDER SEND CHEQUE OR MONEY ORDER, VISA NO#, AND EXP DATE TO ADDRESS ABOVE, PLEASE ALLOW 2 TO 3 WEEKS FOR DELIVERY,

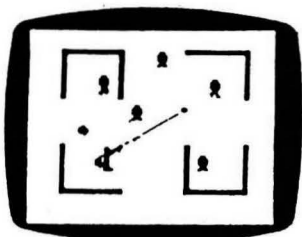
CATALOGUE WITH EVERY ORDER

**PLANET INVASION**  
\$27.95

**CCTHELLO**  
\$22.95



**GALAX ATTAX**  
\$27.95



**ROBOT BATTLE**  
\$27.95

**SPACE RACE**  
\$27.95

**PIRATES AHOY**  
\$11.95

**ESCAPE FROM PRISON CITY**  
\$10.95

Please allow 2-3 weeks for delivery

NO C.O.D. ORDERS

-- COUPON --

MAIL ORDER ONLY PLEASE

**20% OFF**  
**any order over \$30.00**

*Include this coupon with your order to get this special offer.*

-- COUPON --



CANADIANS ORDER IN CANADA AND SAVE. MAIL ORDER OR VISIT THE DEALER NEAREST YOU, ALL PRICES IN CANADIAN FUNDS

DEALERS ON VANCOUVER ISLAND:

IN SIDNEY: SIDNEY RADIO SHACK LTD.

IN VICTORIA: EXCALIBUR SYSTEMS LTD.

IN SOOKE: SOOKE RADIO SHACK LTD.

IN LADYSMITH: LADYSMITH RADIO SHACK LTD.

IN PARKSVILLE: PARKSVILLE RADIO SHACK LTD.

IN COURTEMAY: COURTEMAY RADIO SHACK.

IN CAMPBELL RIVER: CAMPBELL RIVER RADIO SHACK LTD.

IN PORT HARDY: PORT HARDY RADIO SHACK LTD.

## PCLEAR 80 Software...

Thanks to many of you for the nice comments concerning our PEEKS & POKES ads. In response, we'll try to throw in a POKE or a hint or two in each ad. Meanwhile, in response to at least one customer's request, we're compiling all the PEEKS & POKES and other short hints that we know into a T.I.M.S. file. If your order T.I.M.S. from us, we'll include that file with your order. If you already own T.I.M.S., the cost is \$2.00 (free with any order over \$20.00). Be sure to note on your order that you want the POKE file.

If you don't want to purchase T.I.M.S., we'll send you a printout of the file for \$1.00 (again, free with a \$20.00 order).

\*\*\*\*\*  
\*\*\* NEW! \*\*\*

ZAXXON \*32K\* (Data Soft) TP or DSK \$39.95  
ROBOTTACK (INTRACOLOR) \$24.95 TAPE  
TRAP FALL (Tom Mix Software) \$27.95 TAPE  
THE FROG (Tom Mix) \$27.95 TAPE  
DEATH TRAP (Soft Sector Mkt.) \$19.95 TAPE  
COLOR CATERPILLAR (Soft Sector) \$19.95 TAPE  
DEATH STAR (S & S ARCADE) \$19.95 TAPE

\*\*\*\*\*  
OLD FAVORITES

THE KING \*32K\* (Tom Mix) \$26.95 TAPE  
COLORPEDE (Intracolor) \$29.95 TAPE  
KEYS OF WIZARD (Spectral) \$19.95 TAPE  
GHOST GOBBLER (Spectral) \$19.95 TAPE

\*\*\*\*\*  
BUSINESS -- UTILITIES

TELEWRITER-64 (Cognitec) \$49.95 TAPE  
\$59.95 DISK  
T. I. M. S. \*E.B.\* (Sugar Software) \$24.95 TAPE  
WORKSAVER (Platinum Software) \$35.00 TAPE  
TAPE TO DISK (Tom Mix) \$17.95  
TAPE DUPE (Tom Mix) \$21.95  
FIXER (Tom Mix--Disk E.B.) \$17.95  
CCEAD/STRIPPER (Eigen--E.B.) \$13.95  
ALL PROGRAMS 16K NON-EXT. UNLESS NOTED

\*\*\*\*\*

WE STILL HAVE A FEW OLD RAINBOWS (PRE-MAR '82) LEFT AS WELL AS MARCH '83 ON. WE ALSO HAVE THE NEW COLOR COMPUTER MAGAZINE (\$2.95 EA.)

SEND \$5.00 IN STAMPS OR COIN FOR YOUR CATALOG TODAY. (REFUNDABLE WITH ORDER).

We also have some space left (surprise!) so instead of using it to tell you that we're carrying WICO joysticks and adapters, we'll put in the series of POKES that disable the BREAK key.

POKE &HF8, &H32: POKE &HF9, &H62: POKE &HFA, &H1C: POKE &HFB, &HAF: POKE &HFC, &H7E: POKE &HFD, &HAD: POKE &HFE, &HAS: POKE &H19A, &H39: POKE &H19B, &H0: POKE &H19C, &HF6: POKE &H19A, &H7E



**PCLEAR 80 SOFTWARE**

**494 Cline Avenue**

**Mansfield, OH 44907**

**(419) 756-4873**

Note: We also carry the RAINBOW



Add \$2 shipping on orders less than \$50. Please add \$2 for COD. Ohio residents add 5% state sales tax.

you'll see what I mean.

PLAYER ONE: "I open up the door and go into the room."

Did the door actually open? Maybe it was locked or stuck. We roll a die to find out. If it was locked or stuck, additional dice will have to be rolled to see if it was successfully picked or kicked open. Only after all this has been done can we safely assume that the party enters the room.

REFEREE: "O.K., there is a huge cavern on the other side, and you see a large red dragon!"

That's nice. But, dragons have a reputation for sleeping a lot, so we have to roll a die to see if this particular dragon was awake or asleep. Let's assume this one was awake. Was it startled or surprised? Were any of the party members surprised? We have to roll a die for each character and monster involved!

PLAYER ONE: "I draw my sword 'firedrake slayer' and move to the attack."

PLAYER TWO: "While Elrond runs to attack, I fire off a bolt from my crossbow at the dragon."

Before any of this can be decided, we have to find out which side gets the first attack. In most games this is called "initiative." Each side will have to roll a die to determine this. Let us pretend that the dragon wins the initiative and gets to attack first. The dragon can either breathe on the fighters or it can attack with claws and teeth. Which will it choose? You guessed it, roll another die! Whichever choice the dragon makes, its attack may not succeed. The dragon could miss, or the players' armor may protect them, so more dice must be rolled. If the attack does succeed, dice must be rolled to find out how much damage was done.

If any players survive the attack of the dragon, then we get to:

PLAYER TWO: "Did I hit him?"

Gee, my dice are getting a little worn on the corners, and we are still only getting started! To make matters worse, after we roll a die, we have to look up the number we rolled on a large table to find out the result. This result can then be modified by the armor worn by the attackee, the strength of the attacker, what kind of weapon was used, and any magical spells in effect. (There may be several.)

You have to be dedicated to play these games. So far, about five million people have gotten dedicated!

Naturally, since I collect computers, I have been thinking of how to design a computer combat system to take the drudgery out of all this fighting. A big advantage of a computer is that you aren't limited to dice of 6 or 10 or 20 sides. You can have any number of sides you want, and that gives you much more flexibility in designing your combat system.

First, however, a word about the random number command on the Color Computer. RND(n) will return a number from 1 to the number "n." If "n" is 1 or 0, the number returned will be a decimal number larger than 0 but smaller than 1, like .12345678. If the number "n" is a minus number, it will reseed the random number generator with a different seed for each minus number.

Hold on a minute! What was that last? Well, the random number generator is what the computer uses to calculate its random numbers. For example, do a cold start. (That means turn your computer off, wait 15 seconds like the manual says, and turn it back on.) Now type:

10 FOR X=1 TO 10:PRINT RND(100):NEXT X

When you have this line typed into the computer and have entered it, type RUN and press ENTER. If you made no mistakes, a row of 10 numbers from 1 to 100 will appear





FOR THE  
**COLOR  
COMPUTER/  
TDP100**

**COLOR CATERPILLAR** by the Rugby Circle, Inc. ©1983

An ecological system out of control: the last survivors ban together in the valley. Of the predator insects, the caterpillar remains as the worst menace because of its amazing ability to reproduce. From your mobile post, your guns are aimed at the moving target: a raging caterpillar splits in two with each half going in opposite directions. Even if, in your persistence, you manage to destroy the creature, another one appears one segment longer than the previous caterpillar. Adopting to its hostile environment, if the caterpillar reaches the valley below without attacking you, he transforms into a killer moth. Your survival instincts are not nearly so advanced as those of your foe.

Snatch up this survival epic. A challenging fast-action. Machine language, arcade-style game. You'll need plenty of practice. Rated the best arcade simulation of its type. Requires 16K memory for the cassette version. . . . . Only **\$19.95**

**DEATH TRAP** the Rugby Circle, Inc. ©1983

To satisfy your insatiable hunger for wealth, you have set out to explore the ancient ruins of a lost civilization. Protected by your armor-plated tank, you amble through the twisted remains searching for hidden treasures. As you explore the complicated Death Trap which extends far beyond the horizon, your energy supply continually diminishes forcing you to consume the existing fuel mines. Barring your path are various deterrents which, among other things, destroy tanks, award points, supply maps, and teleport your tank to unknown regions of the Death Trap.

Death Trap is a totally unique concept. It is a hybrid game employing the graphics of an arcade game and the excitement of an adventure game, yet requiring the concentration of a strategy game. A great investment! You'll never tire of exploring the immense, seemingly endless maze, and you can look forward to a number of new Death Trap mazes in the future! Requires 16K memory and is written entirely in Machine language. . . . . Only **\$19.95**

**ETT (Electronic Typing Teacher)**

Learn the RIGHT WAY — FAST!

Video Keyboard Guides Beginners —

- Finger Exercises SHOW & TEACH every Finger-Letter combination
- Self-Tests Help Beginners & Challenges Experts!
- 10 Page Student Manual & Self Study Course
- Hundreds of Practice Sentences
- 19 Skill-Building Practice Sets as DATA FILES
- Create your own data files for your own usage

Written by a Certified Teacher and a Professional Programmer. For the Radio Shack® & TDP-100® Color Computers. Requires 16K minimum and Extended BASIC. If you need to learn to type, don't miss this super program. . . . . Only **\$19.95**

**MASTER CONTROL II — New & Improved!**

Copyright ©1982 Soft Sector Marketing, Inc. Written by Alan Schwartz. TAKE CONTROL . . . OF BASIC PROGRAMMING ON YOUR TRS-COLOR OR TDP100 MACHINE.

Master Control is a Machine language program designed to increase the speed in which it takes to write BASIC programs, by providing the most commonly used program statements with two(2) keystrokes rather than having to type the entire command. The program is relocatable and can be placed anywhere in memory, normally the top 1616 bytes of RAM, it will work on 16K and 32K systems. All of the instructions are compatible with the Radio Shack Disk Controller.

OVERVIEW:

1. 51 preprogrammed command keys of standard and Extended BASIC commands.
2. Direct control of motor, trace and audio functions.
3. Relocatable Machine code, now works with disk systems.
4. Automatic line numbering, starting point and increment are alterable.
5. Programmable custom key, you can select your own special function.
6. Direct run key, run the program as you write it.
7. Plastic keyboard overlay for easy program use.
8. Easy entry of commands into program statements.
9. New, complete, easy to understand instruction manual.
10. Repeat keyboard function on all keys.

Requires 16K. Does not require Extended BASIC (Extended BASIC is required for some functions.)

**Introductory Offer — Cassette #0-79 \$19.95**

**ATTENTION PRESENT OWNERS OF MASTER CONTROL —**

If you have the original MASTER CONTROL program, you can update to the newest version for only **\$8.00** plus shipping and handling. To get this low cost update do the following:

- 1) Remove the corner of your old foil overlay that has the words MASTER CONTROL on it.
- 2) Paste it to a piece of paper.
- 3) Send this piece of paper and your original MASTER CONTROL tape with **\$8.00** for the update and \$2.00 for shipping and handling to:

Master Control Update  
c/o Soft Sector Marketing, Inc.  
P.O. Box 340  
Garden City, Michigan 48135

We must have all the above to process your update.

**COLOR GRAPHICS EDITOR**

©1983 Soft Sector Marketing, Inc. Written by Larry Ashmun.

AT LAST, a graphics drawing program that is USEFUL in writing programs that use graphics.

This program permits the creation of graphic pictures on the screen that can be saved to disk in the form of DATA STATEMENTS, for DISK BASIC, or in the form of FDB STATEMENTS, for use with a disk based Editor/Assembler (eg MICRO WORKS MACRO 80C). It allows two type of data entry, testing of animation effects and many additional features.

Written in Machine language, requires Extended BASIC or RS Disk BASIC and a minimum of 16K of memory. Works with cassette or disk. . . . . Cassette #0-211 **\$19.95**

**OKI-PRINT** ©1983 by Craig Edelhelt

DUMP SCREEN GRAPHICS FROM YOUR RADIO SHACK TRS-80\* OR TDP100\* COLOR COMPUTER TO AN OKIDATA MICROLINE 82A SERIAL DOT MATRIX PRINTER 256 x 192 HIGH RESOLUTION.

OKI-PRINT is a BASIC language program that is designed to do high resolution screen dumps from a Radio Shack or TDP100 Color Computer, to an Okidata 82A printer. OKI-PRINT will dump any PMODE M,P (M = MODE, P = PAGE). If the PMODE is 1 or 3 (which are color modes) the printer will attempt to shade the different colors in lighter and darker intensities of black in order to make them more recognizable. Requires 16K Extended BASIC.

. . . . . Cassette #0-23 **\$12.95**

**SSM** SOFT SECTOR MARKETING, INCORPORATED

6250 Middlebelt • Garden City, Michigan 48135  
313-425-4020



**PAYMENT**—payment accepted by charge, personal check or COD, only, under the following conditions: **Charges** processed when shipped, usually within 48 hours. **Personal Checks** delay shipping, pending 3 weeks to clear. **C.O.D.**

orders are certified check or cash only, add \$1.50. MI residents must add 4% sales tax. **SHIPPING & HANDLING — Shipping Charges:** Send the larger amount, 2% or \$2.50, unless stipulated otherwise. Any order received without shipping and handling will be shipped **freight collect Air Mail Shipping** outside of North America, please send the larger amount: 10% or \$10.00. Overpayment will be refunded.

down the left side of the screen. Write those numbers down, in the order they appear. Now, do another cold start, type in the same line all over again, and *RUN* the program one more time. How about that? The SAME 10 numbers! This is a problem in a game. What fun is a game if you can predict what the next roll of the dice will be? The answer to that depends upon whether you're playing Monopoly with friends or craps in Vegas.

What we are getting are PSEUDO-random numbers, and being able to repeat the same series of numbers is very useful in some statistical applications. That won't help our game, though. We need unpredictable numbers. Try the above one line program again, but this time add a line 5 before you *RUN* it. Remember to do a cold start first.

```
5 X=RND(-100)
10 FOR X=1 TO 10:PRINT RND(100):NEXT X
```

This is an improvement. Now we have different numbers. Do it again (remember the cold start with -200. See, different again. That's what we mean when we say that "minus numbers reseed the random number generation." The problem here is that if you use the same minus number you always get the same result. Try the above again with -100 (cold start) and you will see what I mean.

What we need is an unpredictable minus number. The timer is quite unpredictable! After all, it changes 60 times a second, and that may well be the solution. If we change line 5 above to be:

```
5 X=RND(-TIMER)
```

the resulting numbers will become unpredictable. As we continue with our combat system then, we will have to remember to insert the above line into the beginning of our

program.

Before we get off this subject, let me give you another way to insure unpredictable numbers. Since we get the same series of numbers from each seed, we can either change the seed, as we did above, or jump into our series at an unknown point. The program below does both!

```
10 X=RND)-TIMER)
20 CLS0
30 PRINT @ 202, "RANDOMIZING";
40 PRINT @ 293, "PRESS ANY KEY TO GO
ON";:K$=INKEY$
50 IF INKEY$="" THEN X=RND(0) :GOTO 50
60 CLS:FOR X=1 TO 10
70 PRINT RND(100)
80 END
```

In line 10, a new "seed" number is chosen. Then, in line 50, random numbers are chosen over and over again an unknown number of times until you press a key to go on. I have found the above combination to give the best results in BASIC game programs. It isn't necessary to print the "randomizing" message on the screen, or even create a special routine for this. You can simply insert the RND statement into the middle of an INKEY\$ loop somewhere in your program.

Next month we will get into writing the program to computerize a combat system. This is going to be a very complex program, so we'll see how much fits in one column. Meanwhile, give some thought to ideas you would like to see covered in future columns and let me know what you want. Happy Anniversary, *Rainbow*!



## SOUTHERN SOFTWARE SYSTEMS

SERIOUS SOFTWARE FOR THE COLOR COMPUTER

Presenting... **THE GRAPH ZAPPER,**  
**THE BAR ZAPPER and THE PIE ZAPPER**



- **THE PIE ZAPPER** draws pie charts of your data - plain or fancy sectors - 5 kinds of sectors - alternate sectors styles to make an outstanding impact - labeled sectors - option to display raw numbers or percentages on chart with or without totals.
- **THE BAR ZAPPER** creates bar graphs with multiple bars - five different bar styles - positive and negative bars - can use names or numbers for bar identification - plenty of options - *"Extremely easy to use. . . Beautiful. . . Well prepared and documented tool."* The Rainbow, April 1983.
- **THE GRAPH ZAPPER** plots line graphs of data and equations - multiple lines with different symbols - mix equations and data on the same graph - with or without grids - plots lines or points - *"The Graph Zapper is one of the most completely documented pieces of software we have seen. . . The Graph Zapper is an outstanding utility and can be a major tool in statistical, business and other uses where graphic representation of numbers is desirable."* The Rainbow, Dec. 1982
- Endless applications - electric consumption, stock prices, math class equations, children's height and weight, data analysis, trend indication, experimental results, statistical analysis, sales presentations.
- The three **ZAPPERS** provide you with a sophisticated capability that will handle from the simplest to the most complex graphing needs.

### All three ZAPPERS have these Features:

- High resolution graphs with on screen numbers, titles, and labels.
- Sophisticated data editor makes changing data simple.
- Disk version has added features including storing completed graphs on disk and menu driven file loading.
- Detailed user's guides for all features.
- Low resolution graphs can't compare.
- 14 day money back guarantee.
- User friendly, easy to understand.
- Thorough error prevention.
- Save data for later graphing or editing.
- Low cost upgrade from tape disk.
- Hard copies possible with readily available screen print programs for nearly any brand of printer.
- Requires Ext. Color Basic and delivered on cassette.

**\$15.95**

for 16K tape versions

add \$1.00 for shipping . . . send check, money order,  
or VISA/MasterCard number and expiration date

**\$19.95**

for 32K disk versions

\$44.95 for all three tape versions + \$3.00 shipping

\$56.95 for all three disk versions + \$3.00 shipping

Florida residents add 5% sales tax

**VISA — Master Charge accepted**



**SOUTHERN SOFTWARE SYSTEMS**

485 South Tropical Trail, Suite 109 • Merritt Island, Florida 32952 • (305) 452-2217





# Wrapping Up Our Communications Word Processor

By Richard A. White  
Rainbow Contributing Editor

Last month, we began writing a Communications Word Processor program to generate, off-line, text that could be loaded and sent by *COLORCOM/E* or other terminal packages that support line by line transmission of a previously loaded file. Special program features include keeping line counts and a wordwrap feature to move text from overlength lines to the next line. We also want an easy-to-use editor and need printer and cassette or disk file handling ability. The program is modular. That is, specific line numbers were predefined for the various functions we knew had to be included. Main Menu starts at 1000, an easy-to-remember line if you get an error or break the program and want to reenter without losing your data. Following is Table 1 which lists all modules used.

TABLE 1

## Commwp Modules And Number Block Assignments

| Lines     | Module         | Comments                                                      |
|-----------|----------------|---------------------------------------------------------------|
| 5—99      | Subroutines    | Frequently called subroutines used by more than one routine.  |
| 100—199   | Enter Message  | Enter lines at bottom of message.                             |
| 200—249   | Edit           | Phrase substitution editor.                                   |
| 250—299   | Insert         | Put new text between existing lines.                          |
| 300—399   | Wordwrap       | Cut over limit text and add to next line.                     |
| 400—500   | Delete         | Delete line and renumber those above.                         |
| 500—600   | Copy           | Copy line into temporary variable and insert at new location. |
| 600—700   | Printer        | Hard copy for proof or file.                                  |
| 900—1000  | Save/load      | Disk or cassette option.                                      |
| 1000—1050 | Main Menu      | Select primary functional choices.                            |
| 1050—1100 | Configuration  | Configure limits to specific bulletin board requirements.     |
| 2000—2100 | Initialization | Read strings and enter key variables into table.              |
| 10000     | Auto-save      | Run past leader and save two copies to tape.                  |
| 11000     | PCLEAR1        | Avoid SN error.                                               |

(Richard White has a long background with micro-computers and specializes in BASIC programming. With Don Dollberg, he is the author of the TIMS data base management program.)

Last month, we discussed initialization, the Main Menu, bulletin board limits, the program save routine and word-wrap. Focus was on program logic and ways to implement the logic in BASIC. It is now time to do the same thing with the heart of the program, the text entry and editing routines. My assignment is to explain them to you. Your assignment is to understand them well enough that you can make some improvements on your own or use parts of the code in your own programs. Certain objectives we stated last month determine how the text entry sections called from it are to be written and need to be reviewed.

## THE SOFTWARE SHOP

(617) 339-3734

We Specialize In Color Computer Programs  
Call or Write For Our Catalog

| ARCADE STYLE       | UTILITIES         | EDUCATIONAL     |
|--------------------|-------------------|-----------------|
| Pac Attac          | Tape to Disk      | Spelling        |
| Galax Attax        | Disassembler      | Math            |
| Storm              | Assemblers        | Geography       |
| ADVENTURE          | PERSONAL          | BUSINESS        |
| Madness & Minatour | Budget            | Word Processing |
| Keys of the Wizard | Household Expense | Inventory       |
| El Diablaro        | Stock Analysis    | Gen. Ledgers    |

Over 100 Different Programs in Stock!

## THE SOFTWARE SHOP

200 Chauncy Street  
Mansfield, MA 02048

\*Visa and M.C. Accepted\*

1) Display lines used and lines left. As finally implemented, this became lines used and lines allowed.

2) Allow user to scroll up or down through the message using the arrow keys.

3) Edit or delete the bottom line displayed.

4) Be able to insert a new or copied line between others.

5) The editor will be a phrase substitution type, where the user types the material to be removed and then the new text.

6) Provide wordwrap so lines longer than the limit can be typed and the excess from the last space before the limit will be moved into an additional line or added to the next line as appropriate.

7) In addition to arrow key control, how about other control keys like "T" for top of message, "B" for bottom of message and "G" to GOTO a particular line. "G" was not implemented due to screen space limits.

The text entry section code will use certain BASIC routines that could be used again elsewhere in the program. The plan was to identify these and put them in low line numbered (and quickly found) subroutines. The result is that the text entry code starting at line 100 is fairly short.

```
8 PRINT@96,STRING$(32,CHR$(163))
;:IFI>1THENPRINTA$(I-2)
9 PRINTA$(I-1):PRINTA$(I):RETURN
10 PRINT"LINE#"I" LINES"IH" ALLO
WED"LM,MO$" mode ^<ENTER>=COMM
ANDS",,:RETURN
```

```
100 MO$=" enter":CLS4:I=IH+1:GOS
UB10:GOSUB8:LINEINPUTC$:IFLEFT$(
C$,1)<>CHR$(94)THENIFA$(I)=""THE
```

"AN ABSOLUTE JEWEL", "THE PERFECT DBM"  
"I USE C.C.WRITER FOR MY CORRESPONDENCE"  
"IMPRESSIVE", "JUST RIGHT", "PROFESSIONAL"

### Trans Tek Software

has earned these words of praise from reviewers in The Rainbow, 80 Micro, Creative Computing, and other publications. Like our customers, you'll see why when you buy:

C.C.Calc The Electronic Spreadsheet \$34.95

C.C.File The Micro Data Base Manager \$12.95

C.C.Writer Versatile Word Processing \$29.95

C.C.Mailer Mailing List/Letter Merge \$29.95

from

Trans Tek  
194 Lockwood  
Bloomington, IL 60108  
or  
your Favorite Dealer

```
NA$(I)=A$(I)+C$:ELSEA$(I)=A$(I)+
" "+C$ELSE105
```

Since some subroutines will be used by a number of calling routines, we send the calling routine name in MO\$ which starts Line 100. The screen is cleared and the line counter is incremented. If there are no lines yet in the message, IH = 0 and I goes to 1. Subroutine 10 writes a header showing current line, I, number of lines already entered, IH and lines allowed. The " " after LM moves the print location to the second line where the calling mode is printed along with the reminder "up arrow." Followed by ENTER you will shift to Command Mode for scrolling through the message and accessing other functions like Edit, Insert and Delete.

Text is entered using LINE INPUT C\$ so there are no restrictions on keyboard characters that can be entered. When the entry is completed, a nested IF — THEN IF — THEN — ELSE — ELSE — construction is encountered. If the condition after the first IF is not true, control is passed to code following the second ELSE. If that condition is true, the second IF is evaluated and final action will be either the code following the second THEN or first ELSE. Nested conditionals can be tricky. Perhaps the following statement will help.

```
IF(Test 1) THEN (if Test 1 is true) IF (Test 2) THEN (if
Test 2 is true ACTION A) ELSE (if Test 2 is false
ACTION B) ELSE (if Test 1 is false ACTION C).
```

Program clarity considerations more than machine capacity determine how many IF THEN ELSEs you nest. Debugging IF THEN statements can be tricky, which is another reason to consider alternate ways. Weird things can happen if there are errors in test code after the IF. BASIC is looking for only a true or a false indication at this point and messed up test code may not return a syntax error to help you pinpoint a problem. It just won't work right. This can happen in any IF THEN statement, it's just more trying in more complex situations. Let's look at what the code in line 100 is saying.

```
IF (no up-arrow at beginning of C$) THEN IF (A$(I) is
null) THEN (A$(I) = C$) ELSE (A$(I) = A$(I) plus a
space plus C$) ELSE 105.
```

```
102 IH=I:IFLEN(A$(I))>CL GOSUB30
0:IFLEN(A$(I+1))>CL THENI=I+1:GO
TO102:ELSE100ELSE100
105 I=I-1
110 PRINT@480,"COMMAND ?";:GOSUB
12:ONZ GOTO200,250,400,500,1000:
Z=Z-5:CLS3:FG=1:ONZ GOSUB14,16,1
8,20:FG=0:GOTO110
```

Line 102 clarifies why we would need to test for A\$(I) being null. The user is free to enter as much text as desired in a line and wordwrap is called in 102 if text is longer than maximum line length. Wordwrap cuts off enough of the left of C\$ to fill A\$(I) and RETURNS. In line 102, one is added to I and wordwrap is again called if needed until C\$ is used up. Again nested IF — THEN — ELSE statements are used, but the false action for both IFs is to go to 100. Still, two ELSE statements are required, one for each IF. In this special case where actions are identical, 103 GOTO 100 can be substituted for the pair of ELSEs.

If the up-arrow is entered, it is assumed that there is no text, I is reduced in 105 and the program goes into the command mode in Line 110. Subroutine Line 12 is called to print the command options, get the letter keystroke and convert it to a number that is returned in Z. In some cases,



# NOW THERE ARE TWO TOOLKITS FOR THE COLOR COMPUTER

The software development tools that let you put even more **power** into the already powerful Color Computer. They're full of tools, aids, bells and whistles useful to the BASIC or MACHINE LANGUAGE programmer, in friendly, easy-to-use software packages.

## BOTH TOOLKITS CONTAIN . . .

- **Light characters on dark background with Current Line Highlighting**; or normal characters
- **Full Screen Editor** with **Arrow Key controlled cursor**; **open up space/delete and close up space**
- Enabling selective **Line Renumber/copy/move/merge**; or normal Extended Basic line editor
- **Protect** the current BASIC program from being wiped out with a CLOAD, NEW etc.; or from being LISTed
- **Restore** a protected BASIC program/**Append** any number of BASIC programs together easily
- **Tone** on keypress or normal silent keys (Tone modifiable by use of Sound n,n Command)
- **Global Search** of command or text strings in BASIC programs with **wildcard** character and **next "."**
- **9 Screen Print Delays** with keyboard override (for slow, readable LISTings and DISK DIRectories)
- **Variable Name List/String-Byte** memory usage/Range of FREE MEM/Top of memory address display
- Fast Machine Code to BASIC DATA **converter** for storing machine code visibly in BASIC
- (C)SAVEM address/**Backup Tool** (Last file name, start, end and execute address)
- **Recovery of Lost BASIC** programs after NEW, BACKUP, DSKINI, etc.
- **Break Key Disable/Enable** (Pause keys still available)
- **Modified TRON** display (.LN replaces LN)

## THE FULL TOOLKIT ALSO CONTAINS . . .

- Merge BASIC** with Machine Code routines so machine code is "invisible" and (C)SAVE/(C)LOADable
- 9 BASIC RUN delays** with keyboard override; **Single Step(s)** mode with current line number display
- Memory Examine/Modify** with HEX/ASCII/DEC/Double Decimal output and HEX/ASCII input
- Memory **Block Move** for relocating machine code programs, DATA blocks, etc.; or the Kit itself
- Ten User Defined Function Keys** accessible with @/number (BASIC Macros/Block storage)
- Automatic linefeed** for printers that don't/double space LISTings; or normal PRINT
- Delete all spaces** (not in PRINT strings, DATA or REMARK lines)
- ASCII/HEX memory **Dumps** to screen or printer
- Delete all REMarks** (either REM or ' type)
- Parallel **ECHO** of screen output to printer

## THESE FEATURES ARE FOUND ON BOTH VERSIONS . . .

- **Transparent** to the user, Install it and forget it until you need it
- BASIC runs up to one-third faster through the Toolkit (5-10% typical)
- **HELP** command lists all Kit commands and current Kit address
- Same program works with tape or disk and in 16 or 32K
- Entire system totally **removable** at any time
- **Compatible** with other utility programs
- Green/Orange text screen capability
- Easily **modifiable** command syntax

The Kits are **relocatable programs** that load any time without bothering your BASIC program or variables or top of memory address. All tools may be turned on or off at will, including the Kit itself.

The tools are available with simple three or four letter commands entered in the direct mode, with the entire instruction set viewable through the HELP command.

The Colorkit is 5K bytes for \$29.95  
Available on disk with handy BASIC Kit loader for additional \$5



The Microkit is 2.5K bytes for \$27.95  
Manual available separately for \$5

### THE GOOD LIFE

\$16.95

- The Classic Game of Life With:
- 64x64 color symmetrical display
- **3 Selectable birth and old age colors**
- **15 modifiable pre-programmed patterns**
- **Save/Load life screens to tape/disk**
- **Speeds from 8 gen/sec to 1 a second**
- **Joystick or arrow key input**
- **Written in user-modifiable BASIC**
- **With machine code LIFE processor**
- **Help screen command list**
- **Tape/Disk compatible**
- **Selectable color sets**
- **Y&X axis wraparound**



### THE DISK COMMANDER

\$19.95

- Disk File Utility with:
- **One key view/copy/load(m) of files**
- **Two key kill/rename of files**
- **Sort directory on name/extension**
- **Pack directory so new files put at end**
- **Directory keyword search of filename**
- **Print DIR with machine code address**
- **Recover killed files**

### DEER HUNT

\$15.95

- **Arcade shoot-em-up skill game**
- **Aim only for the deer**
- **Avoid hitting people, cars, train**
- **Will not cause tension headache**
- **BASIC/machine code hybrid**
- **Tape/Disk compatible**

**ARIZIN**  
**P. O. Box 8825**  
**Scottsdale, AZ 85252**

like scrolling with the arrow keys, we want to return to 110 to repeat the action or make another choice so a subroutine call is desirable. In other cases, like going to the Main Menu, any return will be from choices at that routine and *GOTO* action is appropriate. Line 12 was written so that the *GOTO* choices are returned as Z=1 through 5. The *ONZ GOTO* comes first in 110 and if Z is greater than 5 no action is taken, the program subtracts 5 from Z and does an *ONZ GOSUB*. When control comes back from the subroutine, we loop back and do 110 again.

```
12 PRINT@32,"TOP BOTTOM UP/DOW
N ARROWS EDITINSERT DELETE COP
Y MENU ";IFFG=1THENRETURN
ELSEFORJ=0TO0:Z$=INKEY$:J=(Z$=""
):NEXT:Z=INSTR("EIDCMTB"+CHR$(94
)+CHR$(10),Z$):IFZ=0THEN12ELSER
TURN
```

I like Line 12 both for what it does and how it does it. First, it prints the Command Mode options. Next it checks if flag FG=1. If so, it returns to the calling routine. Next it gets the letter keystroke and converts it to a number using the *INSTR* routine we discussed last month. Finally, it checks for invalid entries, Z=0, and goes around again in that case. As written, a lower case letter is an invalid entry. In any word processor where the user is likely to be using lower case as not, failure to allow lower case command strokes is intolerable. Your assignment, should you decide to accept it, is to rewrite line 12 and 110 if need be to accept lower case commands. There are at least two ways to do this. One involves changes in 12 and 110. The other splits 12 into two

lines (12 and 13) and does not require changing 110. It's things like this that cause Versions 2.0 and 3.0 to be written.

Coming back to the flag FG=1, this was set in 110. If the action called for involves scrolling the screen or moving to the top or bottom, one of the subroutines 14, 16, 18 or 20 is used. These use subroutines 8 and 10 to rewrite the screen. Since 12 is called by 110, its use in the other subroutines is only to get the command test up quickly so the eye does not notice what 10 wrote on text lines 2 and 3 while the message text is being written. Indeed, the *GOSUB 12* in line 110 might better be in line 105. I leave you to experiment.

The subroutines in lines 14 to 21 do the scrolling and Top and Bottom functions. Pay attention to I and you can figure out how they work.

```
14 I=1:GOSUB10:GOSUB12:GOSUB8:RE
TURN
16 I=I+1:GOSUB10:GOSUB12:GOSUB8
:RETURN
18 IFI>1THENI=I-1
19 GOSUB10:GOSUB12:GOSUB8:RETURN
20 IFI<IH THENI=I+1
21 GOSUB10:GOSUB12:GOSUB8:RETURN
```

It may seem that we have spent an inordinate amount of space on one block of code. But, there was a lot to think about in those few lines. The remaining text functions follow a bit different pattern in that the subroutines pertaining only to that function are in the same code block, following the main routine, and not at the front of the program. You can compare text entry and edit and decide which way you like best or if you even care. Note that I did not follow my original intent, but this would prevent me from going back and doing some rewriting once the program was working to my satisfaction.

I think a phrase substitution editor is the next best thing to a full screen editor and is much easier to implement in a BASIC program. After writing the heading and text lines, the program asks for the "old phrase." This can be any combination of characters that occurs in the last line of text. This occurs in Line 200. There is also the test for no entry and for the up-arrow. Either of these provides escape. Since one may want to make a number of changes in a line, or even change a change just entered, the option to change with the escape is necessary.

```
200 M0$=" edit":CLS5:GOSUB10:GO
SUB8:LINEINPUT"old phrase ";A$:
IFA$=""ORA$=CHR$(94)THEN220
210 F=INSTR(A$(I),A$):IFF=0THENC
LS5:GOSUB10:GOSUB8:PRINT"phrase
not found":LINEINPUT"old phrase
";A$:IFA$=""ORA$=CHR$(94)THEN22
0ELSE210
215 LINEINPUT"new phrase ";B$:L
1=LEN(A$(I)):A=LEN(A$):C$=LEFT$(
A$(I),F-1):L2=LEN(C$):L3=L1-(A+L
2):Q$=RIGHT$(A$(I),L3):A$(I)=C$+
B$+Q$:GOTO200
```

In Line 210, the starting position of the old phrase in the line is found. If the exact combination of characters is not found, *INSTR* returns a zero, we reprint the screen with the message "phrase not found" and the invitation to re-enter the old phrase. A lot of Line 200 code is duplicated, mainly so the message "phrase not found" will be correctly posi-

**ADVANCED MATH PROGRAMS**

for

**ENGINEERS • PHYSICISTS • STUDENTS**

**FUNCTION GRAPHING MODULE 16K EXT-\$19.95**

- \* HIGH RESOLUTION GRAPHS
- \* GRAPH ANY FUNCTION — 4 AT ONCE
- \* PARAMETERS EASY TO CHANGE
- \* AUTO-SCALING OPTIMIZES GRAPH SIZE
- \* FIND AND COMPUTE FUNCTION VALUES & ZEROS
- \* INTERSECTION OF FUNCTIONS
- \* COMPLETE MANUAL — PROGRAM ON TAPE

**CALCULUS MATH MODULE 32K EXT-\$34.95**

- \* STARTS WITH THE GRAPHING MODULE
- \* LOAD UP 9 FUNCTIONS AT ONCE
- \* FIND AND COMPUTE MAXIMA & MINIMA
- \* NUMERIC INTEGRATION & DIFFERENTIATION
- \* COMPOSITE AREAS
- \* HANDLES PIECEWISE CONTINUOUS FUNCTIONS
- \* HARD COPIES OF DATA AND/OR GRAPH
- \* COMPLETE MANUAL — PROGRAM ON TAPE

**CALCSOFT**

P.O. BOX 401

ST. ANN, MO 63074

**CHECK OR MONEY ORDER — \$1.00 for shipping**



## PRETTY PRINTER

This M/L utility program will allow you to write your code in as compact a form as you wish, but list it to the screen or printer in an easy to read 'PRETTY PRINT' format. Turn this: -

```
10 PRINT "EXAMPLE": FORX=ATO M:FORY=STO
P:Z=X+Y:PRINTZ:NEXTY:NEXTX
```

```
Into this: - 10 PRINT "EXAMPLE":
FOR X = A TO M:
FOR Y = S TO P:
Z = X + Y:
PRINT Z:
NEXT Y:
NEXT X
```

With one simple command.

CAT. NO. DM001 16K Ext \$12.95

## P.U.F.F.

Say the magic word and P.U.F.F. your print formatting problems disappear. The Printer Utility File Formatter turns any word Processor (that produces ASCII text files) into a super printer formatter. Embedded codes will perform the following functions: -

- \* Send control codes to your printer.
- \* Set left and right margins at any time.
- \* Set headers and footers.
- \* Left, Right and Fill Justify.
- \* Centre the next 'n' lines.
- \* Temporary indent (neg or pos).

Plus many other features.

CAT. NO. DM002 16K Ext \$24.95

## KEYBOARD OVERLAYS

Many programs are supplied with keyboard overlays to help you keep track of the various commands used by the program. Now you can add overlays to your own programs or to commercial programs that did not come with this feature. Die cut to fit the standard Color Computer keyboard. Dealer inquiries for blank or custom printed overlays are invited.

CAT. NO. HW002 99¢ each

## DATAMAIL

The ultimate cassette based mailing list program for home or business use. Fully customized data collection screen allows you to set your own field lengths and field titles. Fast machine language sort by any column in any field. Save all or any block of files for latter reading by DATAMAIL or your own letter program. Merge two or more lists, search by record number or key word in any column. One key commands for Input, Kill, Change. Print single records or any block of files, 1, 2, 3 or 4 across. 32K holds about 300 files.

CAT. NO. DM003 16K Ext \$14.95

## FIRST SAMPLER

Six programs for the price of one. All have been published in popular computer magazines and are now available on one tape at this special price.

- \* MATH Improve your mental math skills
- \* WORD Make words from the supplied letters in this game for the whole family.
- \* CONVOY Can you sink the computers convoy before it sinks yours?
- \* BAGIT Train your memory to remember the things you put in the bag.
- \* VECTORS Row your boat across the river without going over the falls.
- \* AHHA Find the treasure chest in Another Haunted House adventure. Don't get caught by the Old Miser's ghost.

CAT. NO. DM005 16K Ext \$9.95

## COCOCOPY

This all M/L Program will copy BASIC or M/L programs including most Auto Start Programs. It will supply the beginning, ending and offset addresses and allow you to change the load address for M/L programs. I/O errors are ignored so that bad tapes can be corrected. Programs can be renamed and the motor/audio functions are controlled from the keyboard.

CAT. NO. DM004 16K Ext \$12.95

**SEND \$2.00 FOR OUR 25 PAGE CATALOGUE**

**Refunded with first order**

**We are dealers for the following fine companies: -**

- ARK ROYAL GAMES
- COMPUTER ISLAND
- D S L COMPUTER PRODUCTS
- DYNAMIC ELECTRONICS
- FRANK HOGG LABORATORIES
- HOMEBASE COMPUTER SYSTEMS
- HOME RUN COMPUTER PRODUCTS
- LITTLE BITS COMPUTING SERVICES
- MARK DATA PRODUCTS
- NELSON SOFTWARE SYSTEMS
- RAINBOW CONNECTION SOFTWARE
- SPEECH SYSTEMS
- SUGAR SOFTWARE
- THE PROGRAMMERS GUILD
- TOM MIX SOFTWARE
- WEST BAY COMPANY

**BOOKS from**

**SYBEX \* BYTE \* OSBORNE \* RESTON**

**THE  
DATAMAN**

Box 431, Sta. B  
Hamilton, Ontario  
Canada L8L 7W2  
1-416-529-1319

**ALL PRICES  
IN CANADIAN  
DOLLARS**

**ADD 3% SHIPPING — MINIMUM 2<sup>50</sup>**

tioned. When the old phrase is found, the program moves to 215 to get the new phrase. Then the text line is taken apart into the portion left of the old phrase, C,\$ and the portion to the right of the old phrase, Q\$. It is then put back together with the new phrase in the middle as A\$(I) = C\$ + B\$ + Q\$.

```

220 PRINT@480,"command?";:GOSUB
230:ONZ GOTO200,100,1000:Z=Z-3:C
LS5:FG=1:ONZ GOSUB242,244,246,24
8:FG=0:GOTO220
230 PRINT@32,"TOP BOTTOM UP/DO
WN ARROWS eDIT cURRENT MES
SAGE mENU ";:IFFG=1THENRETUR
NELSEFORJ=0TO0:Z$=INKEY$:J=(Z$="
"):NEXT:Z=INSTR("ECMTB"+CHR$(94)
+CHR$(10),Z$):IFZ=0THEN230ELSERE
TURN
242 I=1:GOSUB10:GOSUB230:GOSUB8:
RETURN
244 I=IH+1:GOSUB10:GOSUB230:GOSU
B8:RETURN
246 IFI>1THENI=I-1
247 GOSUB10:GOSUB230:GOSUB8:RETU
RN
248 IFI<IH THENI=I+1
249 GOSUB10:GOSUB230:GOSUB8:RETU
RN

```

Line 220 does the same thing as Line 110 in text entry and Lines 230 to 249 are similar to 12 to 21 that were used in text

entry. The difference is that the choices in Line 230 are different than those in Line 12 and all subroutines need to be rewritten using 230 rather than 12 as the subroutine call.

The insert routine starting at line 250, the delete routine starting at line 400 and the copy routine at line 500 are built on structures similar to edit which we discussed above. Copy may be viewed as a special case of insert since the source of the text is string memory rather than the keyboard. In each case we need to move strings and we do this by moving the address of the string in the variable table, rather than copying the string itself to a different place in memory.

```

250 MO$="insert":CLS6:GOSUB10:GO
SUB8:PRINT"enter line":LINEINPUT
C$:IFLEFT$(C$,1)=CHR$(94)THEN260
255 FORJ=IH TOI STEP-1:A=VARPTR(
A$(J)):B=VARPTR(A$(J+1)):FORK=0T
04:POKEB+K,PEEK(A+K):NEXT:NEXT:I
=I+1:IH=IH+1:A$(I)=C$:IFCL<LEN(A
$(I))GOSUB300

```

In insert, the new text is obtained in line 250. In line 255, the variable table listing for each string is moved to the next higher array location. The text that was represented by, say, A\$(10), the tenth line is now represented as A\$(11). The program will then move the pointers for A\$(9) up to the A\$(10) location until the right line is opened up for the new text. Delete does the reverse, moving the variable table contents down and in the process erasing the address of the string being deleted. Though the deleted string still exists in memory, the computer has no way of finding it. Eventually a garbage collection will overwrite the deleted material and it will be gone for good.

All of the code for these routines are in the program listing at the end of this article. I invite you to study it. You may also want to rewrite these to use common subroutines in low line numbers to reduce the code in each section.


The printer code starting in line 600 is intended to print the text file for review and editing only. Hence, it is short without refinements. The baud rate setting routine is the fanciest thing there. Feel free to use it in your programs.

As more owners acquire disk drives, the ability to save or load using either tape or disk becomes more important. Tape makes a good long-term storage media for archive purposes and for sending data through the mail. The strategy used here is to have a saving and a loading routine. The variable D, for device number, is used with each OPEN, PRINT# and LINE INPUT# statement so these can apply to either disk or tape operations. For example, line 914 sets D=-1, gets the file name and runs past the tape leader if the user wishes. Control is then passed to 950 to PRINT#-1 the data. But when disk is specified, line 911 sets D=1, gets the file name and transfers control to 950 that pre-forms the disk operation since D=1. Considerable flexibility and performance is achieved with a modest amount of code, much of which is in the menu to make the thing user friendly. Since the program listing follows closely, consult it for the 900 section coding.

This wraps up the discussion of COMMWP. It has served well as a discussion piece. There is much room for improvement and refinement and I hope that some of you do just that. If you do, keep in mind the modular concept that I have been teaching. There is plenty of room for more code in each block, except perhaps 200. You may also want to use the BASIC program framework, perhaps keeping the printer entry and tape/disk I/O and start over to do a different type of program. Once you have a library of program modules

## Chattanooga Choo Choo Software


Your One Stop Station  
For Computer Programs




Track 29

**RAINBOW BIRTHDAY SPECIAL**  
Buy 2 Programs Get 10% OFF

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                   |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>Spectral Associates</b></p> <ul style="list-style-type: none"> <li>Ghost Gobbler</li> <li>Planet Invasion</li> <li>NEW! Space Race \$19.95 ea.</li> </ul> <p><b>Tom Mix Software</b></p> <ul style="list-style-type: none"> <li>*Donkey King (32K) NEW! \$24.95</li> <li>Space Shuttle (32K) \$28.95</li> <li>NEW! Trap Fall #27.95</li> </ul> <p><b>Datesoft Inc.</b></p> <ul style="list-style-type: none"> <li>*Zaxxon <del>\$39.95</del> \$35.95</li> <li>*Moon Shuttle <del>\$34.95</del> \$31.45</li> </ul> | <p><b>Anteco Software</b></p> <ul style="list-style-type: none"> <li>Intergalactic Force \$24.95</li> <li>Pinball &amp; 8 Ball \$24.95</li> <li>(Both available in Rom Pac) \$29.95 ea.</li> <li>(Available on Rom Pac Only)</li> <li>Whirly Bird Run \$29.95</li> <li>Ghost Gobbler \$29.95</li> </ul> <p><b>Computerware</b></p> <ul style="list-style-type: none"> <li>Doodle Bug \$24.95</li> <li>Rail Runner \$21.95</li> </ul> <p><b>Prickley-Pear Software</b></p> <p>15 % Off</p> <ul style="list-style-type: none"> <li>*Vikings, *Flight (32K), Football <del>\$19.95</del> \$16.95 ea.</li> </ul> | <p><b>Soft Sector Marketing</b></p> <ul style="list-style-type: none"> <li>Color Caterpillar,</li> <li>NEW! Death Trap</li> <li>Master Control II \$19.95 ea.</li> </ul> <p><b>Mark Data Products</b></p> <ul style="list-style-type: none"> <li>Super Pro Keyboard \$69.95</li> <li>*Astro Blast, Cave Hunter and Haywire \$24.95 ea.</li> </ul> |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|



All programs 16K on cassette unless otherwise stated  
Send for free complete catalog and descriptions!  
WE pay postage, YOU save money! (in the U.S. and Canada)  
TN residents add 6.25% sales tax, C.O.D orders add \$2.00



(615) 875-8656 • P.O. Box 15892 • Chattanooga, Tn 37415



## "TRS-80 COLOR COMPUTER PRODUCTS"

### "ENHANCED 1248-EP EPROM PROGRAMMER"

The list of directly compatible EPROMs increases by one, now including: 2508's, 2758-0/1's, 2516's, 2716's, 2532's, 2732's, 68732-0/1's, 68764's, and 68766's.

#### NEW FEATURES INCLUDE:

- 1) Intelligent algorithm that reduces programming time to as little as 1/6 that of fixed cycle programmers.
- 2) Diagnostic routines to isolate defective EPROMs, or locate differences.
- 3) A feature that guards against EPROM type entry errors.
- 4) Diagnostic routines that prevent keyboard entry errors from causing disastrous consequences.

#### FIRMWARE FEATURES

- 1) EPROM ERASED!
- 2) COMPARE EPROM TO RAM!
- 3) BLOCK PROGRAMMING!
- 4) BYTE PROGRAMMING!
- 5) DUMP EPROM TO RAM!
- 6) JUMP!

Firmware is "stack-oriented", "position independent", and "menu driven". Supplied in an EPROM, it can also be stored on disc or tape for execution from RAM if desired.

#### STANDARD HARDWARE FEATURES

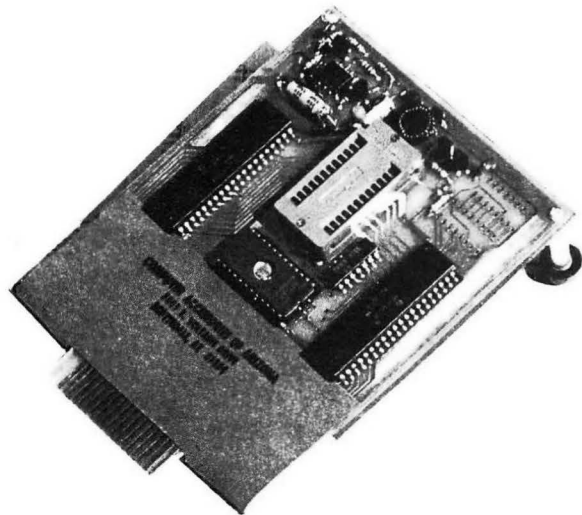
- 1) It has its own "on-board" 25 volt programming supply.
- 2) A quality textool "zero insertion force" (ZIF) socket.
- 3) Socket for firmware on-board.

A PIA port is also available on the programmer. This 8 bit parallel I/O port with handshake lines, can be used for many applications, such as a parallel printer port. Details on how to use this port as a printer interface are included in the instruction manual.

The instruction manual describes how to take full advantage of the power of this versatile programmer. We think you'll agree, that never before was an EPROM programmer so easy to use, and feature packed as is the 1248-EP.

The enhanced 1248-EP costs only \$129.95.

Firmware upgrades are available to our previous 1248-EP customers, in EPROM, for just \$29.95.



\* TRS-80 is a trademark of TANDY CORP.  
\*\* SDS80C is a trademark of the MICRO WORKS.

### "THE CK4 SERIES PROM / RAM CARDS"

The CK4 cards work with 2K, 4K, and 8K ROMs or EPROMs of the 5 volt only variety in 24 pin packages. The CK4 can also work with static RAMs, and increase your available memory by as much as 16,128 bytes.

The CK4-1 is specifically designed for use in computers with "F" series boards, or those machines that are "write protected" in the address range of \$C000 through \$FEFF. The CK4-1, therefore, does not incorporate features designed in the CK4 for use with RAM.

The CK4-2 is the unpopulated version of the CK4 series board. Buy this version and configure to meet your specific requirements, and stretch the value of your dollar.

#### FEATURES SUMMARY

- |                           |                                 |
|---------------------------|---------------------------------|
| 1) MIX ROM AND RAM!       | 4) EXTREMELY FLEXIBLE DECODING! |
| 2) EXPAND RAM FROM 2-16K! | 5) PROVIDES FOR BATTERY BACKUP! |
| 3) YOU WRITE PROTECT RAM! | 6) LOW COST!                    |

#### PRICES

CK-4 \$29.95 ea.      CK4-1 \$27.95 ea.      CK-2 \$15.95 ea.

### NEW PRODUCT OFFERING

#### A/D-80C ANALOG TO DIGITAL CONVERTER BOARD

The A/D-80C is a 16+ channel analog to digital converter with two 8 bit PIA ports plus handshake lines.

- \* Implement closed-loop control of analog processes!
- \* Use it to control your homes environment!
- \* Computerize your laboratory or darkroom!
- \* Build a multi-channel voltmeter!
- \* Use it for waveform generation!
- \* For robotics!

The A/D-80C is software programmable up to a maximum of 10 bits of resolution. The number of channels can be expanded beyond the 16 channel capability supplied, and the channels are software selectable.

The A/D-80C performs nearly 9K A/D conversions per second.

A generous area of the board is designated for wirewrapping to permit customization of analog signal processing circuitry.

Extensive documentation is provided to assist the user in the development of his application. Software listings are provided as an aid to software development, and a socket is provided for an EPROM for user developed software drivers.

CONSULT FACTORY FOR AVAILABILITY AND PRICE INFORMATION ON NEW PRODUCTS

### FACTORY FRESH COMPONENTS:

| <u>ITEM</u> | <u>DESCRIPTION</u>             | <u>PRICE</u> |
|-------------|--------------------------------|--------------|
| 2716 EPROM  | 2K by 8 Bit,                   | \$4.50 ea.   |
| 2532 EPROM  | 4K by 8 bit,                   | \$6.50 ea.   |
| 6821P       | P.I.A.                         | \$3.50 ea.   |
| 74LS156     | Open collector decoder         | \$1.70 ea.   |
| Socket      | Textool "Zero Insertion Force" | \$9.00 ea.   |

Minimum component order: \$25.00

### ORDERING INFORMATION:

Add \$3.00 to all orders to cover shipping and handling. Canadian residents add 5% to cover special handling. Arizona residents add 5% sales tax. All items shipped UPS. Please allow 2-3 weeks for delivery. Prices subject to change without notice.

Make checks payable to:

**COMPUTER ACCESSORIES OF ARIZONA**  
5801 E. VOLTAIRE DRIVE  
SCOTTSDALE, ARIZONA 85254  
(602) 996-7569

like these, you can reuse them in other programs with minor modifications. Indeed, neither the I/O nor the printer routines were written for *COMMWP*.

|          |      |
|----------|------|
| 210..... | 0386 |
| 255..... | 0629 |
| 310..... | 0869 |
| 442....  | 0AA5 |
| 542..... | 0D26 |
| 640..... | 101D |
| 915..... | 1260 |
| 1050 ... | 1514 |
| END ...  | 1745 |

The listing:

```

0 GOTO11000
5 I=I-1
8 PRINT@96,STRING$(32,CHR$(163))
;:IFI>1THENPRINTA$(I-2)
9 PRINTA$(I-1):PRINTA$(I):RETURN
10 PRINT"LINE#I" LINES"IH" ALLO
WED"LM,MO$" mode ^<ENTER>=COMM
ANDS",,:RETURN
12 PRINT@32,"tOP bOTTOM UP/DOW
N ARROWS eDITiNSERT dELETE cOP
Y mENU ";:IFFG=1THENRETURN
ELSEFORJ=0TO0:Z$=INKEY$:J=(Z$="
"):NEXT:Z=INSTR("EIDCMTB"+CHR$(94)
)+CHR$(10),Z$):IFZ=0THEN12ELSERE
TURN
14 I=1:GOSUB10:GOSUB12:GOSUB8:RE
TURN

```

```

16 I=IH+1:GOSUB10:GOSUB12:GOSUB8
:RETURN
18 IFI>1THENI=I-1
19 GOSUB10:GOSUB12:GOSUB8:RETURN
20 IFI<IH THENI=I+1
21 GOSUB10:GOSUB12:GOSUB8:RETURN
100 MO$=" enter":CLS4:I=IH+1:GOS
UB10:GOSUB8:LINEINPUTC$:IFLEFT$(
C$,1)<>CHR$(94)THENIFA$(I)=""THE
NA$(I)=A$(I)+C$:ELSEA$(I)=A$(I)+
" "+C$ELSE105
102 IH=I:IFLEN(A$(I))>CL GOSUB30
0:IFLEN(A$(I+1))>CL THENI=I+1:GO
TO102:ELSE100ELSE100
105 I=I-1
110 PRINT@480,"COMMAND ?":GOSUB
12:ONZ GOTO200,250,400,500,1000:
Z=Z-5:CLS3:FG=1:ONZ GOSUB14,16,1
8,20:FG=0:GOTO110
200 MO$=" edit":CLS5:GOSUB10:GO
SUB8:LINEINPUT"old phrase ";A$:
IFA$=""ORA$=CHR$(94)THEN220
210 F=INSTR(A$(I),A$):IFF=0THENC
LS5:GOSUB10:GOSUB8:PRINT"phrase
not found":LINEINPUT"old phrase
";A$:IFA$=""ORA$=CHR$(94)THEN22
0ELSE210
215 LINEINPUT"new phrase ";B$:L
1=LEN(A$(I)):A=LEN(A$):C$=LEFT$(
A$(I),F-1):L2=LEN(C$):L3=L1-(A+L
2):G$=RIGHT$(A$(I),L3):A$(I)=C$+
B$+G$:GOTO200
220 PRINT@480,"command ?":GOSUB
230:ONZ GOTO200,100,1000:Z=Z-3:C
LS5:FG=1:ONZ GOSUB242,244,246,24
8:FG=0:GOTO220
230 PRINT@32,"tOP bOTTOM UP/DO
WN ARROWS eDIT cURRENT MES
SAGE mENU ";:IFFG=1THENRETUR
NELSEFORJ=0TO0:Z$=INKEY$:J=(Z$="
"):NEXT:Z=INSTR("ECMTB"+CHR$(94)
)+CHR$(10),Z$):IFZ=0THEN230ELSERE
TURN
242 I=1:GOSUB10:GOSUB230:GOSUB8:
RETURN
244 I=IH+1:GOSUB10:GOSUB230:GOSU
B8:RETURN
246 IFI>1THENI=I-1
247 GOSUB10:GOSUB230:GOSUB8:RETU
RN
248 IFI<IH THENI=I+1
249 GOSUB10:GOSUB230:GOSUB8:RETU
RN
250 MO$="insert":CLS6:GOSUB10:GO
SUB8:PRINT"enter line":LINEINPUT
C$:IFLEFT$(C$,1)=CHR$(94)THEN260
255 FORJ=IH TOI STEP-1:A=VARPTR(
A$(J)):B=VARPTR(A$(J+1)):FORK=0T
O4:POKEB+K,PEEK(A+K):NEXT:NEXT:I
=I+1:IH=IH+1:A$(I)=C$:IFCL<LEN(A

```

### TRS-80 COLOR BASIC

by BOB ALBRECHT

*Beginners*

This entertaining self-instructional book is packed with games, experiments, scores of intriguing challenges, and activities related to fantasy role-playing games. The ideal introductory aid for kids, parents and teachers using the Color Computer.

John Wiley & Sons  
605 Third Ave., New York, NY 10158

\$9.95

### TRS-80 COLOR COMPUTER GRAPHICS

by DON INMAN

*Intermediate*

Explore the creative and imaginative blending of computers and color. This exciting book will enable you to explore all the graphics capabilities of Extended Color BASIC.

Reston Publishing Company  
11480 Sunset Hills Rd., Reston, VA 22090

\$14.95

### ASSEMBLY LANGUAGE GRAPHICS FOR THE TRS-80 COLOR COMPUTER

by DON INMAN and KURT INMAN

*Advanced*

This book is specific to the TRS-80 Color Computer with applications using sound and graphics to illustrate how an assembler can be used to perform feats that would be quite difficult, if not impossible in the BASIC language.

Reston Publishing Company

\$14.95

### DYMAX, P.O. 310, MENLO PARK, CA 94025

Dymax orders must be prepaid via check, money order, Visa or Mastercard. Sorry, no Purchase Orders or COD orders. Please add \$2.00 shipping and handling. California residents add 6% sales tax.





# HARDWARE & SUPPLIES

## JARB INC SOFTWARE HARDWARE

1636 D Avenue, Suite C  
National City, CA 92050  
(619) 474-6213

### MONITORS

**BMC GREEN SCREEN 12"**  
..... 89.95

#### COMREX CR 5600 HI-RES MONITORS

12" Green Phosphor ..... 179.95  
12" Yellow Phosphor..... 189.95  
12" Amber Phosphor..... 199.95

#### COMREX CR 5500 GREEN SCREEN

12" Phosphor Monitor ..... 129.95

### VIDEO PLUS

(From Computerware)

This unit is so good, we have stopped producing our popular video interface kit so that we can supply our customers with the best unit available. Requires no soldering or hole cutting for installation. Will work on ANY composite monitor, color or monochrome.  
Only..... \$24.95

#### BMC-BM-AU919IU

(13" Color Monitor)

High resolution display monitor produces an incredibly sharp image. Includes built-in speaker with audio circuit. Compatible with virtually any microcomputer.  
..... \$344.95

### DUAL JOYSTICK UNIT

(D.J.)

Single unit assembly enhances playability of multi-joystick/player games; convenient press-to-fire buttons  
Add \$4.00 shipping ..... \$35.95

### SPLC-1

Lower Case Board

(By Saturn Software)

Plug in board gives true lower case letters with descenders instead of inverted letters on your video display. Installation of an optional switch (not provided) allows inverse or standard video with the flip of a switch. Fits all "E" and later "D" boards.  
..... \$59.95

### L CINT

Lower case interpreter program allows input of lower case command words to be accepted. Also allows for one key pause features and single step through listings. With instructions and cassette, disk compatible. .... \$10.95

U.S FUNDS ONLY

C.O.D. ORDERS ACCEPTED

Sorry, no C.O.D. on printers and monitors.

NO CREDIT CARD ORDERS

### PRINTERS

#### EPSON PRINTERS

FX-80+ ..... \$575.00  
RX-80 ..... \$449.00  
Serial Interface w/4K Buffer  
Ideal for 80C use ..... \$109.95  
80C/O Epson Cable ..... \$19.95

See shipping Info

#### PRINTER ACCESSORIES

Roll Paper Holder (Epson) ..... 30.00  
Adjustable Tractor for FX-80 ..... 39.95  
Also Tractor Fed Mail Labels and  
Cassette Labels, Ribbons, etc.

#### COCO PRINTER PACKAGE

Epson FX-80 and Serial Interface with 4K Buffer, Cable. .... 674.90

#### COMREX CR-1

Compact desk-top daisy wheel printer, especially designed for word processing. Assures high reliability, and produces quiet, high quality printing. Complete with RS-232 interface.  
..... \$810.00

#### JARB DISK DOUBLER

Why spend twice as much as you need to for double sided diskettes? With our doubler, you can make your own and pay for it with the first box you double. A must for disk drive users.  
5 1/4" size only ..... 12.95

#### BASF DATA CASSETTES

|       | C-05    | C-10    |
|-------|---------|---------|
| 1-10  | .60 ea. | .65 ea. |
| 11-20 | .55 ea. | .60 ea. |

Soft Poly Cases ..... Ea. \$ .20  
Hard Shelled Cases ..... Ea. \$ .22  
Cassette Labels (12) ..... Sh. \$ .36  
Cassette Labels Tractor (1000) ..... \$30.00

Call or write for quantity prices on all cassette products. Special lengths available, eg., C-02, etc.

We carry products  
from many manufacturers.  
If you don't see it, ask.

SHIPPING AND HANDLING: Printers and monitors add 3%. Unless otherwise specified, all other orders \$2.00 per order. California Residents add 6% sales tax.

### MEMORY UPGRADE KITS

**16K RAM CHIPS** ..... 1.50 ea.

#### \* 16K/32K

#### MEMORY UPGRADE KIT

Eight 200 NS 4116 Factory Prime Chips with Piggy Backed Sockets, Sam Socket, Bus Wire, and 32K Ram Sticker. Comprehensive Instructions. Recommended for "D" or earlier, but may be used on "E". Only 9 simple solder connections to kit. None to computer.  
..... \$25.95

#### \* 64K RAM CHIPS

Eight 200 NS Factory Prime 64K RAM Chips. Allows you to upgrade "E" board easily. No soldering needed.  
..... \$69.95

NOTE: 64K upgrade will NOT provide 64K of user Ram, but allows later revision boards (E, ET) to run cooler and more efficiently.

\*Installation of these items will void the Radio Shack warranty. Radio Shack is a trademark of the Tandy Corp.

#### NANOS COLOR BASIC AND EXTENDED SYSTEM REFERENCE CARD

"The New Industry Standard"  
\$4.95

(We pay postage on this one)  
All types of Nanos cards available

## JARB INC SOFTWARE HARDWARE

COMPUTER PRODUCTS  
1636 D Avenue, Suite C  
National City, CA 92050  
(619) 474-6213

# HELP WANTED

Dragon Slayers, Space Pilots, Witch Doctors, Maze Makers, Professors and other creative programmers.

## We Want You!

Your original Color Computer Software program is worth money and we want to discuss it with you...

## Earn Top Buck!



24001 ALICIA PKWY., NO. 226  
MISSION VIEJO, CA 92691  
(714) 768-1551

## COMPUTERS

Growing Company with lots of

P  
Po  
exp  
Req  
assi  
knc

13  
Co

M  
Wit  
Illu  
com  
doll  
mac  
Com  
poss  
expe  
is  
th

```

$(I)GOSUB300
260 PRINT@480,"command?";GOSUB
270:ONZ GOTO250,100,1000:Z=Z-3:C
LS5:FG=1:ONZ GOSUB282,284,286,28
8:FG=0:GOTO260
270 PRINT@32,"top bottom up/do
WN ARROWS insert current m
ESSAGE menu ";IFFG=1THENRETUR
NELSEFORJ=0TO0:Z#=INKEY#:J=(Z#="
"):NEXT:Z=INSTR("ICMTB"+CHR$(94)
+CHR$(10),Z#):IFZ=0THEN270ELSERE
TURN
282 I=1:GOSUB10:GOSUB270:GOSUB8:
RETURN
284 I=IH+1:GOSUB10:GOSUB270:GOSU
B8:RETURN
286 IFI>1THENI=I-1
287 GOSUB10:GOSUB270:GOSUB8:RETU
RN
288 IFI<IH THENI=I+1
289 GOSUB10:GOSUB270:GOSUB8:RETU
RN
300 FORJ=I TOIH:F1=0:IFLEN(A$(J)
)<CL THENNEXT:RETURN
305 F=INSTR(F1+1,A$(J)," "):IFF<
CL ANDF<>0THENF1=F:GOTO305ELSEC#
=RIGHT$(A$(J),LEN(A$(J))-F1):A$(
J)=LEFT$(A$(J),F1)
310 IFJ<IH ANDA$(J+1)<>"ANDLEFT
$(A$(J+1),1)<>" THENA$(J+1)=C#+

```

```

"+A$(J+1):NEXT:RETURN
315 IFJ=IH THENA$(J+1)=C#:RETURN
320 FORJ1=IH TOI STEP-1:A=VARPTR
(A$(J1)):B=VARPTR(A$(J1+1)):FORK
=0TO4:POKEB+K,PEEK(A+K):NEXT:NEX
T:IH=IH+1:A$(J1+1)=C#:NEXT
400 MD$="delete":CLS7:GOSUB10:GO
SUB8:PRINT"delete this line? Y/N
":FORJ=0TO0:C#=INKEY#:J=(C#="
"):NEXT:IFC#=CHR$(94)ORC#<>"Y"THE
N410405 FORJ=I TOIH-1:A=VARPTR(A
$(J+1)):B=VARPTR(A$(J)):FORK=0TO
4:POKEB+K,PEEK(A+K):NEXT:NEXT:I=
I-1:IH=IH-1
410 PRINT@480,"command?";GOSUB
420:ONZ GOTO400,100,1000:Z=Z-3:C
LS5:FG=1:ONZ GOSUB442,444,446,44
8:FG=0:GOTO410
420 PRINT@32,"top bottom up/do
WN ARROWS delete current m
ESSAGE menu ";IFFG=1THENRETUR
NELSEFORJ=0TO0:Z#=INKEY#:J=(Z#="
"):NEXT:Z=INSTR("DCMTB"+CHR$(94)
+CHR$(10),Z#):IFZ=0THEN420ELSERE
TURN
442 I=1:GOSUB10:GOSUB420:GOSUB8:
RETURN
444 I=IH+1:GOSUB10:GOSUB420:GOSU
B8:RETURN
446 IFI>1THENI=I-1
447 GOSUB10:GOSUB420:GOSUB8:RETU
RN
448 IFI<IH THENI=I+1
449 GOSUB10:GOSUB420:GOSUB8:RETU
RN
500 CLS8:GOSUB10:GOSUB540:GOSUB8
:PRINT"copy this line? Y?":FORJ=
0TO0:Z#=INKEY#:J=(Z#=""):NEXT:Z=
INSTR("YCMTB"+CHR$(94)+CHR$(10),
Z#):IFZ=0THEN500
505 ONZ GOTO510,100,1000:Z=Z-3:C
LS8:ONZ GOSUB542,544,546,548:GOT
O500
510 C#=A$(I)
515 CLS8:GOSUB10:GOSUB540:GOSUB8
:PRINT"insert... "C#:PRINT"here
? Y?":FORJ=0TO0:Z#=INKEY#:J=(Z#="
"):NEXT:Z=INSTR("YCMTB"+CHR$(94)
+CHR$(10),Z#):IFZ=0THEN515
520 ONZ GOTO525,100,1000:Z=Z-3:C
LS8:ONZ GOSUB540,544,546,548:GOT
O515
525 FORJ=IH TOI STEP-1:A=VARPTR(
A$(J)):B=VARPTR(A$(J+1)):FORK=0T
O4:POKEB+K,PEEK(A+K):NEXT:NEXT:I
=I+1:IH=IH+1:A$(I)=C#:GOTO500
540 PRINT@32,"top bottom up/do
WN ARROWS current m
ESSAGE menu ";RETURN
542 I=1:RETURN

```



# INTERNATIONAL COLOR COMPUTER CLUB, INC.

A Non-Profit Educational Corporation

Main Office

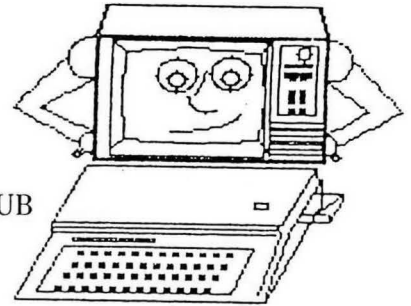
2101 E. Main St., Henderson, Texas 75652

Canadian Branch

P.O. Box 7498, Saskatoon, SK S7K-4L4



WORLD'S LARGEST COLOR COMPUTER CLUB



HERE ARE SOME GOOD REASONS TO JOIN OUR CLUB

- 1). **FREE PROGRAMS:** Good programs written by our members are contained in our library, in the newsletter, and on the new member tape.
- 2). **NEWSLETTER.** A "magazine" sized newsletter (last issue was 80 pages), with programs, tips, data, reviews, articles and much more.
- 3). **NEWSLETTER Tape.** A tape of all the programs appearing in the newsletter is available from the library for \$2.00 (to members) or \$4.50 (to non-members).
- 4). **CLUB LIBRARY.** The club maintains a library of programs, books, and Radio Shack ROM-packs. The programs are member written and come six program to a tape or disk. They are yours to keep; however, there is a small fee to cover the postage and tape (or disk) of \$2.00 (\$4.50 for disk). The books and ROM-packs may be checked out for 3 weeks at a time (extensions possible).
- 5). **DISCOUNTS.** You can get large discounts on many software and hardware items for the Color Computer from some of the MAJOR companies. Also discounts on subscriptions to the RAINBOW, Color Computer News, Color Computer Magazine, Chromasette Magazine, and CoCocassette Magazine (up to 25%).
- 6). **ADVERTISE FREE.** Members may place ads up to ¼ page (classified type) per issue during their entire membership in the newsletter FREE. Display ads at 25% off. These ads must be computer related; however.
- 7). **BORROW PARTS.** Don't wait weeks for the parts to come in from Radio Shack! Just check them out from the Club's Parts library and return them when yours arrive.
- 8). **SURPRISE.** You receive a "New Member" package containing many useful items.
- 9). **GET HELP.** This is the world's largest Color Computer Club. With members in almost every field of expertise. So if you have a problem with the Color Computer, we can almost always get you the answer. Put your problem on the Club's Bulletin Board, write, or call. Telephone No. (214) 657-7834.
- 10). **FIND FRIENDS.** As a new member, you will receive a list of the members in your area on a quarterly basis whom you may contact for CoCo talk.

## HOW TO BECOME A MEMBER:::

Write to the club for an application, there are no conditions for membership other than agreeing to obey the rules and by-laws, being interested and paying the dues. The membership dues are \$30.00 (\$50.00 outside the U.S. (In Canada it is in Canadian funds) in U.S. funds) per year and we believe you get more than your moneys worth. You can save more than the membership dues in discounts the club offers to you. Example : Subscription to the RAINBOW, 25% off of the regular subscription rates. Some members have told me that the new member tape alone is worth the membership dues. It contains 10 very good programs. Some of the programs contained in the library are Accounts Receivable, General Ledger, Inventory, Sales File and ticket program with automatic Inventory update (for 32K with 2disk ). There is over 72 programs in the library to choose from ranging from 4K to 64K w/disk.



```

544 I=IH+1:RETURN
546 IFI>1THENI=I-1
547 RETURN
548 IFI<IH THENI=I+1
549 RETURN
600 POKE65494,0:BP=PEEK(150):BU=
INSTR("61841 87 180",RIGHT
$(STR$(BP),LEN(STR$(BP))-1)):BU=
4800/BU
610 CLS:PRINT@73,"PRINT ROUTINES
",,,," CURRENT BAUD RATE ="BU,
TAB(6)"RESET BAUD RATE",,,," P
RINT TEXT",,,," MENU":CT=1
615 CT$=RIGHT$(STR$(CT),1):LP=IN
STR(" 1 2 3",CT$):LP=LP*32+2:
PRINT@LP,">";FORJ=0TO0:Z$=INKEY
$:J=(Z$=""):NEXT:PRINT@LP," ";
620 IFZ$=CHR$(10)ANDCT<3THENCT=C
T+1:GOTO615ELSEIFZ$=CHR$(94)ANDC
T>1THENCT=CT-1:GOTO615ELSEIFZ$<>
CHR$(13)THEN615ELSEON CT GOTO625
,640,1000
625 PRINT " ";INPUT"ENTER NEW BA
UD RATE";BU$:BU$=LEFT$(BU$,1):BL
=INSTR("36124",BU$):IFBL=0THENPR
INT"baud rate error":SOUND100,50
:GOTO600
630 BU(1)=180:BU(2)=87:BU(3)=41:
BU(4)=18:BU(5)=6:POKE150,BU(BL):
GOTO600
640 CLS:PRINT@194,"SET TOP OF SH
EET AT PRINTER HEAD AND PR
ESS ANY KEY":FORJ=0TO0:J=(INKEY$
=""):NEXT:LM=INT(80/CL):FORJ=1TO
5:PRINT#-2," "
650 FORI=1TOIH:PRINT#-2,TAB(LM)A
$(I):NEXT:GOTO1000
900 CLS3:PRINT@66," SAVE TO TAP
E ";PRINT@130," SAVE TO DISK
";PRINT@194," LOAD FROM TAPE"
;PRINT@258," LOAD FROM DISK";:
CT=1905 CT$=RIGHT$(STR$(CT),1):L
P=INSTR(" 1 2 3 4",CT$):LP=LP*32
+2:PRINT@LP,">";FORJ=0TO0:Z$=IN
KEY$:J=(Z$=""):NEXT:PRINT@LP," "
;
910 IFZ$=CHR$(10)ANDCT<4THENCT=C
T+1:GOTO905ELSEIFZ$=CHR$(94)ANDC
T>1THENCT=CT-1:GOTO905ELSEIFZ$<>
CHR$(13)THEN905ELSEON CT GOTO914
,911,913,912
911 D=1:PRINT@322,"FILE NAME";:I
NPUTNA$:GOTO950
912 D=1:PRINT@322,"FILE NAME";:I
NPUTNA$:GOTO920
913 D=-1:PRINT@322,"FILE NAME";:
INPUTNA$:GOTO920
914 D=-1:PRINT@322,"FILE NAME";:
INPUTNA$:PRINT@386,"RUN PAST LEA
DER Y/N":INPUTI$:IFI$="Y"THENMOT
ORON:FORK=1TO6000:NEXT::GOTO950
915 GOTO950

```

## TRS-80\* COLOR COMPUTER\*

- 16K Extended Basic, Menu-Driven, Well-Documented, Easily-Modified.
- For either cassette or diskette systems (Be sure to specify).
- Place an order of at least \$40 and get one extra of your choice free.
- Orders shipped on cassette - Add \$5 for shipment on diskette.

### -FURST-



Data Element Dictionary driven File Update and Retrieval SysTem. Create and maintain files according to your specifications. Ideas for applications included.....\$25

### -REPORT WRITER-



Used in conjunction with FURST to selectively format reports on your printer. Includes headings and total capabilities.....\$15

### -MAILING LABELS-



Generate and maintain mailing label records. Selectively print desired quantities. Can keep several label files if desired. Designed for Printer VII, easily modified.\$20

### -EXERCISE PLANNER-



Build and maintain complete exercise schedule for regular and/or weight programs. Display guides you through daily-calculated routines. Print complete schedule if desired.....\$15

### -DISK DIRECTORY PRINT-



For diskette users only. Get hard copy of disk directories on your printer for easy use and reference. Only \$5

Send check or money order to:



**LAND SYSTEMS**

P.O. Box 232  
Bellbrook, Ohio 45305



\*TRS-80 and COLOR COMPUTER are Trademarks of Tandy Corp.



```

920 OPEN"I",D,NA#:I=0
925 IF EOF(D) THENCLOSED:IH=I:GO
TO1000
930 I=I+1:LINEINPUT#D,A*(I):GOTO
925
950 AUDIOON:OPEN"O",D,NA#:FORI=1
TOIH:PRINT#D,A*(I):NEXT:CLOSED:I
FCT>0AND D=-1THENMOTORON:FORK=1T
0600:NEXT:MOTOROFF:CT=0ELSE1000
1000 CLS3:PRINT@41,"COMMUNICATIO
NS";PRINT@73,"WORD PROCESSOR";
PRINT@105,"VERSION 1.0 ";PRIN
T@197,"NEW MESSAGE ";P
RINT@229,"CURRENT MESSAGE "
;
1005 PRINT@261,"BULLETIN BOARD L
IMITS";PRINT@293,"PRINT MESSAGE
";PRINT@325,"SAVE/LOAD
MESSAGE ";FORJ=0TO0:Z#=INKEY
#:J=(Z#=""):NEXT:Z=INSTR("NCBPS"
,Z#):IFZ=0THEN1000
1010 ONZ GOTO1020,100,1050,600,9
00
1020 FORI=1TO50:A*(I)="":NEXT:I=
0:IH=0
1050 CLS3:PRINT@70,"BULLETIN BOA
RD LIMITS";PRINT@166,"CHARACTER
S/LINE "CL;PRINT@198,"LINES/ME
SSAGE "LM;PRINT@230,"OK AS I
S ";FORJ=0TO0:Z#=IN

```

```

KEY#:J=(Z#=""):NEXT:Z=INSTR("CLO
",Z#):ONZ GOTO1060,1070,1080
1055 GOTO1050
1060 C#="":PRINT@184," ";FORK=
0TO1:FORJ=0TO0:Z#=INKEY#:J=(Z#="
"):NEXT:PRINT@184+K,Z#;C#=C#+Z#
:NEXT:CL=VAL(C#):GOTO1050
1070 C#="":PRINT@216," ";FORK=
0TO1:FORJ=0TO0:Z#=INKEY#:J=(Z#="
"):NEXT:PRINT@216+K,Z#;C#=C#+Z#
:NEXT:LM=VAL(C#):GOTO1050
1080 IFIH=0THEN100ELSEIFIH>LM TH
ENCLS3:PRINT@168,"CURRENT MESSAG
E";PRINT@299," HAS MORE LINES "
;PRINT@232,"THAN LIMIT SET.";P
RINT@296," PRESS ANY KEY ";PRIN
T@328," TO CONTINUE ";FORJ=0TO
0:J=(INKEY#=""):NEXT
1090 I=1:GOSUB300:GOTO100
2000 CLEAR5000:DIMA*(50)
2010 CL=64:LM=16:A=0:B=0:K=0
2100 GOTO1000
10000 AUDIOON:INPUT"RUN PAST LEA
DER Y/N";I#:IFI#="Y"THENMOTORON:
FORX=1TO6000:NEXT
10010 FORC=1TO2:CSAVE"COMMWP":MO
TORON:FORX=1TO600:NEXT:NEXT:MOTO
ROFF'END
11000 PCLEAR1:GOTO2000

```

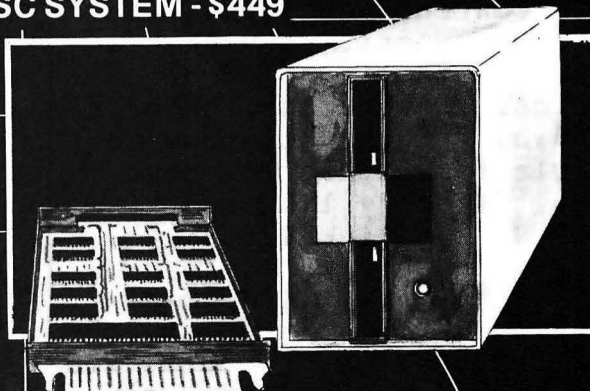
# They Driving Force!

## JFD - COCO DISC SYSTEM - \$449

J & M Systems, Ltd. is a leader in the Model III marketplace with our JFD-III Disc Controller. With thousands in operation, we have set new standards in controller performance and reliability. We bring these same high standards to the COCO, resulting in the highest quality disc controller system on the market. Compare these functions before you buy:

- Price. \$449 includes controller, first drive, disc basic in ROM, and manuals. Just plug it in.
- Never needs adjusting. Our exclusive Digital Phase Lock Loop Data Separator and Digital Pre-comp Circuit eliminates the 3 adjustments found on other controllers.
- High quality standard production disc drives. For improved service and reliability, Tandon & Teac drives provide twice the read sensitivity that the drives found in other disc systems do, and hold their alignment far longer.
- Gold-plated card edge connectors throughout.
- Software compatible with Radio Shack Disc Basic, Flex, and OS/9.

J & M Systems, Ltd., 137 Utah NE, Albuquerque, N.M. 87108  
(505) 265-1501




**J&M SYSTEMS, LTD.**

# Doin' the Hi-Res Shuffle

Program  
By  
Phillip Beistel

*Shuffle is one of three programs on the Rainbow  
'Record.' See page 146.*

If you've ever shuffled little numbered plastic squares around on a palm-sized plastic board, trying to order them chronologically, you know the game called Shuffle. Whether in its solid form it was called that or something else, I'm unsure. Nevertheless, it was always enjoyable—an established item in that revolving crop of kid-crazes which included the yo-yo, Hula hoop and Gumbo shooter.

In its computerized form, the game gives up its pocket portability, but it gains in pizzazz with some very nicely done

*(Mr. Beistel has been associated with large computer hardware and software for nearly 15 years and has been writing 80C software during the last three years.)*

## FLY the F16 Instrument Flight Simulator



Variable control sensitivity for beginner or expert. Navigate a new course each flight or do aerobatics. Instrument takeoffs and landings. Get yours now to be eligible for future low cost upgrades. Specify 16K or 32K. Tape \$19.95 Disk \$21.95

### LPVII/DMP 100 Descenders

Its as if your printer had built in descenders. Load, execute, and forget its there. The lowercase set: `abcdefghijklmnopqrstuvwxy`  
16K/32K Tape or Disk \$14.95  
Add \$1.00 Shipping on all orders.

**KRT Software** 813-321-2840  
**P O Box 41395**  
**St Petersburg, Fl 33743**

hi-res graphics. Phillip Beistel's outstanding version of this classic, by the way, is not only listed here, but is also one of the three programs on our *Rainbow* "Record" which you will find on page 146.

*Shuffle* has a couple of quite interesting features: the most obvious is the flashing name at the top of the screen. The routine starting at line 46 does the flashing. Also, Phillip uses the keyboard rollover table to allow faster access of the keyboard. You'll find this within the line 46 routine, as well.

The game will randomly place 15 numbers inside a 4 x 4 matrix. The object is to rearrange the numbers into ascending order by using the arrow keys to move the blank square and, consequently, the numbers, around the screen. If you get frustrated, you can quit at any time by pressing the "Q" key. When the game is either finished, or you quit, the number of moves and the time used is displayed.

We think this is an excellent quality game, worthy of its inclusion in our first "record," and hope you will take advantage of this for easy loading. For those who prefer the direct approach, we give you the following listing.

The listing:

```

1 RUN6
2 ' SHUFFLE
3 ' by PHIL BEISTEL
4 ' 1439 ARNOLD ST.
5 ' PGH, PA. 15220
6 IF PEEK(&HC000)=126 AND PEEK(&
HC001)=126 THEN POKE65495,0
8 XR=RND(-TIMER):GOTO109
9 CLS(RND(8)):PRINT@11,"' SHUFFLE
'";:PRINT@96," ARRANGE THE NUMBE
RS FROM 1 TO":PRINT" 15, UPPER L
EFT TO LOWER RIGHT.":PRINT" USE
THE ARROW KEYS TO MOVE."
10 PRINT@228,"DUPLICATE THIS PAT
TERN."::PRINT@298," 1 2 3 4";
:PRINT@330," 5 6 7 8";:PRINT@
362," 9 10 11 12";:PRINT@394,"13
14 15 ";

```

11.....01D3  
26.....0472  
38.....0727  
50.....0A77  
70.....0C1F  
90.....0F17  
END ... 1044



# LEARN A SECOND LANGUAGE ON YOUR COLOR COMPUTER • NEW • EXCITING • EASY

*Creative Courseware using the latest technology and Professional Programming*



- Fulfill your educational objectives
- Have fun learning a new language
- Expand your children's horizons.
- Improve your job potential
- Young and old can learn
- Affordable, only pennies per hour.

- **SEE** — High quality visuals, not dotted graphics
- **HEAR** — High quality audio as spoken by natives
- **UNDERSTAND** — Through programmed instruction
- **RESPOND** — Branching, and looping insure learning.

## Our Lessons Teach You to HEAR and THINK in a Second Language

These lessons are for you if you:

- Think you can't learn
- Have had previous difficulties
- Want to start out right
- Want language success

## Lessons Now Available in Spanish, English and French

- Color Computer with 16K RAM and tape recorder required
- SLU-1: People, Persons & Family
- SLU-2: Stand, Walk & Run
- SLU-3: Smile, Eat & Talk
- SLU-4: House
- SLU-5: Open & Closed
- SLU-6: Furniture & Appliances
- SLU-7: Meals
- Vocabulary #1, 2 & 3: 200 words each

## Other Lessons and Languages Available Soon

## Special Values

### Special Value #1

SLU 1-3, VOCAB 1, and Lesson Control A **\$129.75** Value for only **\$99.95**.  
SV-1 (specify language desired).....\$99.95

### Special Value #2

SLU 1-7, VOCAB 1-3, and Lesson Control A **\$249.45** Value for only **\$199.95**.  
SV-2 (specify language desired)...\$199.95

**Demonstration Lesson** (for the doubter)  
DEMO-1 ..... \$9.95

### Individual Lessons:

(specify language desired)  
Second Language Usage (SLU) \$19.95  
Vocabulary (SL) ..... \$19.95

**Lesson Control:** (only one copy needed for all lessons and languages)  
LC-CC ..... \$49.50

## HOW TO HEAR AND THINK IN A SECOND LANGUAGE

Skilled linguists have developed our series of second language programs. The lessons utilize the power of programmed instruction wherein you are advanced to new material only after satisfactory learning has occurred at the current level. Our techniques teach you how to think in a language without initially using any printed text material. No mental translation to your native language is required. You learn as a child does, hearing and speaking before reading. The computer both tutors and keeps track of progress as it moves you forward (or backward when review is necessary). AUDIO plus VISUALS plus INTERACTIVE RESPONSE establish the learning process, and literally THOUSANDS of visuals help seal-in the sound patterns of your new language.

All of our lessons are interactive and user friendly; yet, you are unaware of the complex course structure involved. For example: Lesson SLU-1 uses the theme of PEOPLE, PERSONS & FAMILY to teach the use of nouns to name things, to classify them into categories, and to identify members of a group. Sentence structure is developed using the verb 'be' and its relationship to nouns and adverbs, including plural forms and inversions. Noun structure using definite and indefinite articles, and regular and irregular plural forms is also presented. The other lessons are similarly designed. In addition, each VOCABULARY LESSON presents approximately 200 visuals and 200 words that are integrated into the learning process.

While the foregoing might seem complex, and it is, IT IS ALSO THE REASON OUR COURSEWARE CAN TEACH LANGUAGES. If you have tried 'game' or 'tape' language programs you know that they are ineffective. Our programs can teach you a language because we have successfully combined expert authoring of programmed courseware with **audio & visuals & response & branching** into a powerful tutorial package.

### DEALER INQUIRIES ACCEPTED

We have a broad range of Audio Visual Computer Aided Instruction under development. Some users of our courseware might include Day Care Centers, Schools (public and private), institutions in various categories, individuals and language tutors.

### ABSOLUTELY NO RISK

You may examine your order for 15 days. If you decide not to take advantage of the lesson(s) simply return in good condition for a full refund or cancellation of credit card charges.

### \*WE PAY UPS IN USA

(street address required for UPS)  
\*Add \$2.00 if US Mail desired.

\*Add 15% for foreign, APO & FPO (Remit in US Funds)  
\*Virginia Orders add 4% sales tax  
\*Mail credit card orders please include all card information

### WE ACCEPT

- VISA and MASTER CARD
- Money Orders
- Certified Checks

- Other Checks (must clear before shipment)

### FREE ORDER LINE

1-800-368-6300

\*\*\*

**FOR VIRGINIA ORDERS AND OTHER CALLS:**  
1-804-463-6300

\*\*\*

**BASIC PROGRAMS, INC.**  
236 Mustang Trail, #102  
Virginia Beach, VA 23452

```

11 DIM A(4,4),B(16):X16=0:Y16=0:
M=0:ZT=0
12 S$="T200L200D4V31;1;2;3;4;5;6
;7;8;9;10;11;12;11;10;9":T$="T10
0;L100V31;04;1;12"
13 FORX=1TO4:FORY=1TO4:A(X,Y)=0:
NEXTY:NEXTX:SCREEN0,0:FORX=1TO16
:B(X)=X:NEXTX
14 FORX=1TO4:FORY=1TO4
15 D=RND(16)
16 IF B(D)=0 THEN 15
17 IF D=16 THEN X16=X:Y16=Y
18 A(X,Y)=B(D):B(D)=0:NEXTY,X
19 PMODE1,1:PCLS
20 DRAW"C2;S8;BM72,4;BD1D1F1R3F1
D2G1L3H1BU5E1R3F1BR4BU1;D7U4R5NU
3D4;BR4BU7D6F1R3E1U6BR4NR5D3NR4D
4BR5;BU7BR4NR5D3NR4D4BR5;BR4BU7D
7R5;BU7BR4NR5D3NR4D4R5"
21 DRAW"C3;S4;BM28,28;R203;D163;
L203;U163"
22 PAINT(40,30),2,3
23 DRAW"C3;S4;R51;D163;R51;U163;
R51;D163;R50;U40;L203;U41;R203;U
41;L203"
24 GOSUB52
25 FORX=1TO4:FORY=1TO4
26 PLAY T$:X$=STR$((X-1)*50)+32
):Y$=STR$((Y-1)*40)+32):ON A(X

```

```

,Y) GOTO 29,30,31,32,33,34,35,36
,37,38,39,40,41,42,43,44
27 PRINT@483,"(PRESS ANY KEY TO
PLAY.)";I$=INKEY$
28 I$=INKEY$:IF I$="" THEN 28 EL
SE SCREEN1,0:GOTO53
29 DRAW"C4;S8;BM"+X$+",""+Y$+"BD5
BR8E3D13NL3R3":GOTO44
30 DRAW"C4;S8;BM"+X$+",""+Y$+"BD6
BR8U2E1R6F1D4G1L7D6R7":GOTO44
31 DRAW"C4;S8;BM"+X$+",""+Y$+"BD2
BR6R6F1D4G1NL4F1D4G1L6":GOTO44
32 DRAW"C4;S8;BM"+X$+",""+Y$+"BD2
BR12ND14G8R12":GOTO44
33 DRAW"C4;S8;BM"+X$+",""+Y$+"BD3
BR6NR8D6R7F1D4G1L7H1U2":GOTO44
34 DRAW"C4;S8;BM"+X$+",""+Y$+"BD3
BR7R6F1H1L6G1D10F1R6E1U6H1L6G1":
GOTO44
35 DRAW"C4;S8;BM"+X$+",""+Y$+"BD3
BR6R10G2D1G2D1G2D1G2D1":GOTO44
36 DRAW"C4;S8;BM"+X$+",""+Y$+"BD2
BR8R6F1D4G1L6H1U4NE1D4F1G1D5F1R6
E1U5H1":GOTO44
37 DRAW"C4;S8;BM"+X$+",""+Y$+"BD3
BR8R6F1D4G1L6H1U4NE1D4F1R6G6":GO
TO44
38 DRAW"C4;S8;BM"+X$+",""+Y$+"BD5
BR4E2D12NL2R2BR4R4E1U10H1L4G1D10
F1":GOTO44
39 DRAW"C4;S8;BM"+X$+",""+Y$+"BD4
BR4E2D12NL2R2BR4R2NR2U12G2":GOTO
44
40 DRAW"C4;S8;BM"+X$+",""+Y$+"BD5
BR4E2D12NL2R2BR4NR5U6R4U1R1U4L1U
1L3D1L1":GOTO44
41 DRAW"C4;S8;BM"+X$+",""+Y$+"BD4
BR4E2D12NL2R2BR4R4E1U4H1NL3E1U4H
1L4":GOTO44
42 DRAW"C4;S8;BM"+X$+",""+Y$+"BD4
BR4E2D12NR2L2BR12U12G6R8":GOTO44
43 DRAW"C4;S8;BM"+X$+",""+Y$+"BD5
BR4E2D12NL2R2BR3BU1NU2F1R6E1U4H1
L6U6R7":GOTO44
44 IF M<>0 THEN RETURN ELSE NEXT
Y,X
45 GOTO27
46 DRAW"C2;S8;BM72,4;BD1D1F1R3F1
D2G1L3H1BU5E1R3F1BR4BU1;D7U4R5NU
3D4;BR4BU7D6F1R3E1U6BR4NR5D3NR4D
4BR5;BU7BR4NR5D3NR4D4BR5;BR4BU7D
7R5;BU7BR4NR5D3NR4D4R5"
47 IF PEEK(339)=251 OR PEEK(341)
=247 OR PEEK(342)=247 OR PEEK(34
3)=247 OR PEEK(344)=247 THEN 50
48 DRAW"C3;S8;BM72,4;BD1D1F1R3F1
D2G1L3H1BU5E1R3F1BR4BU1;D7U4R5NU
3D4;BR4BU7D6F1R3E1U6BR4NR5D3NR4D
4BR5;BU7BR4NR5D3NR4D4BR5;BR4BU7D
7R5;BU7BR4NR5D3NR4D4R5"

```

## SP SOFTWARE

### FOUR NEW PROGRAMS FOR YOUR COLOR COMPUTER

**SPDUMP** A screen dump routine of 360 bytes of fast, relocatable machine language code. All PMODES, color PMODES in 4 B&W shades, twice size option in PMODES 3 or 4, position dump on paper, inverse image option, do more than 1 screen as for MPP graphics. Works on DMP2000 LPVII etc. Comes with BASIC instructions. Needs BASIC1.1 or an 8bit printer fix. On tape. \$16

**CONCPOLY** Use this menu driven program to design and draw a fantastic variety of intricate and colorful patterns, suitable for dump to a printer. includes examples and instructions. Works in a 16K computer, EXT. or DISK BASIC. Comes on tape. \$8

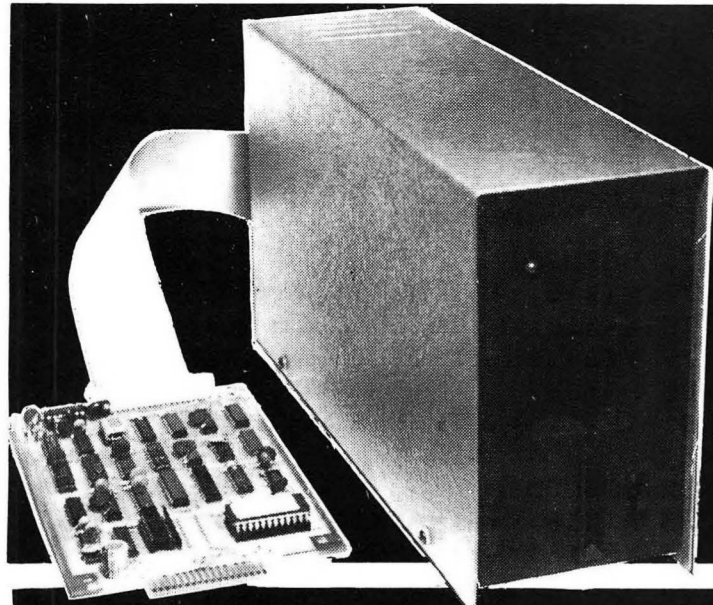
**SIXFOURK** Use your 64K computer from BASIC. This program allows you to inspect RAM, move ROM to RAM and run it there, disable DISK or EXT. BASIC, and make setups with graphics, program, strings, and USR in upper or lower RAM to get the best use of RAM. The program does the setups and includes tutorials and instructions to let you make setups. On tape. \$20

**ROTORLD** This showy program for the 64K computer will display a rotating color globe of the earth. You get 20 frames of a PMODE1 globe which is loaded into 60K of RAM by a driver program plus an instruction program all on disk to show off your 64K color computer. \$25

Free little graphics program with order or request for our catalog. For fast service send check or MO to:

SP SOFTWARE, 1102 BILTMORE, LYNCHBURG VA 24502





# "THE ALTERNATIVE" COLOR COMPUTER DISK SYSTEMS

**NOW ONLY 449<sup>95</sup>** 40 TRACK DRIVE **200 K BYTES**  
USER STORAGE

**NOW ONLY 549<sup>95</sup>** 80 TRACK DRIVE **400 K BYTES**  
USER STORAGE

**ROM SOFTWARE**  
A Full Featured  
Basic Compatible DOS

**INCLUDES:** TC-99 Disk Controller w/CCMD 9 DOS ROM • 40 Or 80 Track Disk Drive • Power Supply • Case • 2 Drive Cable • 9 Disk Utility Programs • CCEDT9 Disk Text Editor • Disk Text Processor I

Manufactured Under License From Tall Grass Technologies

## Editor / Assembler CO-RES9

CO-RES9 is a Co-resident Editor/Assembler that will allow you to create, edit and assemble machine language programs for the color computer. It will quickly and efficiently convert assembly language programs into machine code files. It will output machine object code to either cassette tape in a 'CLOADM' compatible format or directly to memory for direct execution.

CO-RES9 editor / assembler tape  
w/manual ..... ~~\$39.95~~ **NOW ONLY \$29.95**

R.S. DISK EDITOR & ASSEMBLER Disk  
w/manual ..... ~~\$79.95~~ **\$49.95**

## Text Pro II

"The Professional's Word Processor"

### TEXT PROCESSOR FEATURES

- Character Fill
- Programmable Footer
- Right Justify Line
- Multiple Footnotes
- Three Indent Modes
- Three Programmable Headers
- Ten Programmable Tab Stops
- Margin Justification Left & Right
- Decimal Align, Center, Left & Right Justify on Tab Column
- Display & Input from Keyboard
- Change Formatting During Processing

### TEXT EDITOR FEATURES

- Single Keystroke Edit Command
- Append Files From Tape or Disk
- Fully Integrated Disk File Handler
- Edit or Process Files Larger Than Memory
- (No Conversion Required) Fully ASC II Compatible
- Full Featured Line Oriented Screen Editor
- Search and Replace Any Character Pattern
- Copy, Move or Delete Lines or Blocks of Text
- Edit Basic, Text or Assembler Files

**TEXT PRO II Features Over 70 Commands In All. Disk ... \$79.95**

# DATA PACK TERMINAL PACKAGE

- Full Text Buffering
- Terminal Baud Rates 300 To 9600 Baud
- Automatic Word Wrap Eliminates Split Words
- Full/Half Duplex
- Automatic File Capture
- Programmable Word Length, Parity & Stop Bits
- Automatic Buffer Size At Memory Limit
- Save & Load Text Buffer To Tape Or Disk
- Send Files Directly From Buffer Or Disk
- Full Disk Support For Disk Version
- Printer Baud Rates 110-4800
- Send Control Codes From Keyboard
- ASCII Compatible File Format

- Display On Screen Or Output Contents Of Buffer To Printer

We also have a disk version available called "DISKPACK." It includes all the commands mentioned plus commands for disk control. They include: Disk Load, Disk Save, Directory, Send Disk File and Kill Disk File. As usual all files are Basic Compatible ASCII formatted files which are also compatible with our Text Editor and Word Processor programs.

Datapack on tape w/ manual ..... **\$24.95**  
Diskpack for R.S. disk w/ manual ..... **\$49.95**  
Diskpack for CCMD 9 w/ manual ..... **\$39.95**



5566 Ricochet Avenue  
Las Vegas, Nevada 89110

**(702) 452-0632**

All Orders Shipped  
From Stock  
Add \$2.50  
Postage

```

49 IF PEEK(339)<>251 AND PEEK(34
1)<>247 AND PEEK(342)<>247 AND P
EEK(343)<>247 AND PEEK(344)<>247
THEN 46
50 RETURN
51 PAINT(((X16-1)*50)+32, ((Y16-1
)*40)+32), 2, 3: RETURN
52 PAINT(((X16-1)*50)+32, ((Y16-1
)*40)+32), 4, 3: RETURN
53 TIMER=0
54 M=1: GOSUB46
55 IF PEEK(339)=251 THEN 108
56 ZT=ZT+1
57 IF PEEK(341)=247 THEN 62
58 IF PEEK(342)=247 THEN 75
59 IF PEEK(343)=247 THEN 68
60 IF PEEK(344)=247 THEN 81
61 GOTO54
62 IF Y16=4 THEN SOUND100, 1: GOTO
54
63 GOSUB51
64 A(X16, Y16)=A(X16, Y16+1)
65 X=X16: Y=Y16: GOSUB26
66 Y16=Y16+1: GOSUB52
67 GOTO87
68 IF X16=4 THEN SOUND100, 1: GOTO
54
69 GOSUB51

```

```

70 A(X16, Y16)=A(X16+1, Y16)
71 X=X16: Y=Y16: GOSUB26
72 X16=X16+1: GOSUB52
73 GOTO87
74 END
75 IF Y16=1 THEN SOUND100, 1: GOTO
54
76 GOSUB51
77 A(X16, Y16)=A(X16, Y16-1)
78 X=X16: Y=Y16: GOSUB26
79 Y16=Y16-1: GOSUB52
80 GOTO87
81 IF X16=1 THEN SOUND100, 1: GOTO
54
82 GOSUB51
83 A(X16, Y16)=A(X16-1, Y16)
84 X=X16: Y=Y16: GOSUB26
85 X16=X16-1: GOSUB52
86 GOTO87
87 IF A(1, 1)=1 AND A(2, 1)=2 AND
A(3, 1)=3 AND A(4, 1)=4 AND A(1, 2)
=5 AND A(2, 2)=6 AND A(3, 2)=7 AND
A(4, 2)=8 AND A(1, 3)=9 AND A(2, 3
)=10 AND A(3, 3)=11 AND A(4, 3)=12
AND A(1, 4)=13 AND A(2, 4)=14 AND
A(3, 4)=15 THEN 89
88 GOTO54
89 WN=TIMER: CLS (RND(8))
90 SC=1: FORQ=1TO10
91 SCREEN1, SC
92 PLAY S$
93 IF SC=1 THEN SC=0: GOTO95
94 SC=1
95 NEXT Q
96 PRINT@99, " YOU COMPLETED THE
PUZZLE ";
97 PRINT@138, " IN"; ZT; "MOVES ";
98 SC=1
99 SQ=INT(WN/60): MQ=INT(SQ/60): S
Q=SQ-MQ*60
100 IF MQ=0 THEN 102
101 PRINT@170, MQ; "MIN. AND"; SQ;
"SEC. ";: GOTO103
102 PRINT@170, SQ; "SEC. ";
103 PRINT@481, "PRESS Y TO TRY AG
AIN. N TO END";
104 I$=INKEY$: IF I$="" THEN 104
105 IF I$="Y" THEN M=0: CLS (RND(8
)): PRINT@200, " RESTARTING ";: TIM
ER=0: ZT=0: GOTO12
106 IF I$<>"N" THEN104
107 CLS (RND(8)): PRINT@203, "T.T.F
.N. ";: PRINT@448, "BYE-BYE";: POKE6
5494, 0: NEW
108 CLS (RND(8)): PRINT@102, " YOU
GAVE UP AFTER ";: PRINT@138, ZT; "M
OVES AND ";: WN=TIMER: GOTO98
109 PCLEAR2: GOTO9

```

## Co Co - Cooler



- Brings operating temperature to ambient, regardless of accessory load

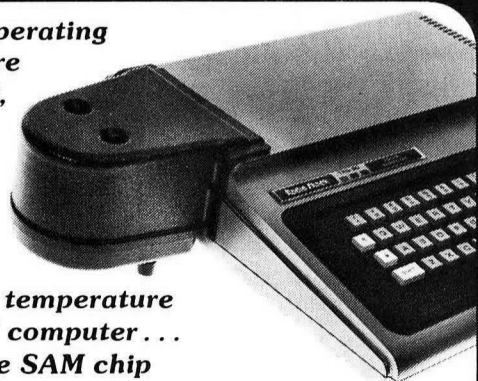
- Reduces temperature of ENTIRE computer... not just the SAM chip

- Easy 1-minute installation • \$39.95

Companion Keyboard Cover \$7.95  
Co Co Software

- Send For Free Catalog • For Fastest Service Send Money Order Or Certified Check • Add \$2.00 Shipping Charge Per Order • Calif. Residents Add 6½% Sales Tax • All Merchandise Shipped From Stock •

**REM Industries, Inc.**  
9420 "B" Lurline Ave., Chatsworth, CA 91311  
**(213) 341-3719**





## Stock Option Strategies For Experienced Traders

Stock options—Ah, visions of gleaming Rolls Royces, a seaside hideaway in the Caribbean, and me sipping rum drinks with bits of tropical fruit floating in them. All this and more drifted through my mind as I gazed at the *Stock Option Strategies* cassette in my hand.

Stock options offer the potential of immense gains for relative small investments, they also have a darker side—the possibility of sudden and complete loss of your investment.

The question was would this program and my trusty 80-C be able to guide me around the pitfalls of sudden loss and to a life of ease and plenty which I so justly deserve?

I'm sad to report that this review is being typed into my CoCo in the somewhat cluttered office of my home, instead of overlooking blue waters with a tanned companion at my side.

Advertising for the *Stock Option Strategies* program states that the program allows you to devise your own stock option strategies. Alas, the program did not allow me to do so. The problem lies more with the documentation than the program.

Program documentation only consists of a ¾ page xeroxed copy of typed instructions. Assumptions are made that the user is familiar with all the terminology of buying stock options, how they work and where to find the necessary information.

For instance, if you know what a strike price is, you're OK, if not, forget it, Charlie. The only hint as to where to find necessary information is a reference advising you to consult the Wall Street Journal.

A common mistake has been made by the author in assuming that the user has a working knowledge of the specific activities associated with the program. The program makes sense to the author, so it must be fine. Testing the program with end users often leads to adding needed additional explanations and instructions.

Documentation on a program of this type should include an explanation of how stock options are traded and a complete and concise set of definitions for all requested *INPUTS*.

Instructions on how to "test run" a few examples to familiarize yourself with the programs operation should also be included so that the user can become comfortable with the program before taking a plunge with more than monopoly money. The single paragraph explanation of the mechanisms involved in stock option trading is just not enough.

The program itself does not offer the "bells and whistles" one expects from a professionally marketed, business-oriented program. The frills, like a colorful title page, are missing, but more important options, like saving your data and results to disk or tape for later retrieval, or printing your data on a printer, are also missing.

The program has a routine which graphs future stock prices in color and shows the resultant gains and losses.

Overall, the detail and presentation of *Stock Option Strategies* is not what I would expect from a tape available from a mailorder software marketer.

Greentree Software has missed regarding their target audience. In its existing form, it is most usable only by those now actively involved in stock option trading. I cannot recommend this program to those interested in learning about stock options before investing. As mentioned before, the problem lies more with incomplete documentation than the program itself.

*Stock Option Strategies* requires 16K.

(Greentree Software, P.O. Box 97, Greenwood, IN 46142, \$14.95)

—Bruce Rothermel

Hint . . .

### Saving In ASCII

When you SAVE programs, CoCo can perform this function in two ways, by using binary codes or actual letters and numbers (called ASCII and pronounced AS-KEY).

Although it takes longer, ASCII sometimes is a more accurate way to SAVE a program, especially when you may be transferring programs between systems—say from a disk-based to a cassette-based system.

To SAVE in ASCII, simply add a comma and an "A" to the end of your SAVE instruction, like this: CSAVE "PROGRAM",A and the ASCII SAVE will be done by CoCo.



## ★ ★ CoCo T-SHIRTS ★ ★

HANES QUALITY — TAN WITH COLORFUL GRAPHICS  
GREAT FOR INDIVIDUALS AND CLUBS

SIZES: SM, MED, LG, XLG CHILDS 10/12, 14/16

PRICES: \$6.95 EA. OR 2-5 AT \$6.50 EA.,

6-11 AT \$6.25 EA., OR 12 & UP AT \$5.95 EA.

**SPECIFY QUANTITY AND SIZE WHEN ORDERING  
SEND CHECK OR MONEY ORDER TO:**

### CoConut Products

6400 N.W. 34th AVE., FT. LAUDERDALE, FLORIDA 33309

SEND \$1.00 FOR POSTAGE AND HANDLING

# Memory

## Brain Strain With Schmaltz

By Jim Schmidt

*Memory* is several things at once. Obviously, it's a game. But it is also something of a memory trainer. Based on sound research, the concepts it uses are valid and real. It remains to be seen, however, if the memory improvement one seems to experience will last.

The use of simple ASCII character graphics along with sound, and care taken in the borders of the instructions give added interest, I hope, to the program.

All of us have purchased programs that perform quite well in their functions, but have such minor imperfections as misspelled words, words broken on the screen, vague instructions, and endless black text on green. It seems that having gotten the program to run properly, the programmer quits! Not much (if any) thought is given to packaging and eye appeal.

*Memory* is perhaps the other extreme. I normally would not load up such a simple game with as much gingerbread. It was done primarily to illustrate some of the things that can be done quite easily.



Regardless of what program you're working on, I don't think it ever hurts to throw in a little schmaltz!

*Memory* is one of three programs on the Rainbow 'Record.' See page 146.

For those with 16K machines, a PCLEAR 1 will be needed prior to CLOADing to provide enough free memory to load the program.

|               |               |
|---------------|---------------|
| 30..... 0049  | 1440 ... 13D3 |
| 150.... 01CB  | 1620 ... 16B5 |
| 480.... 05A6  | 1770 ... 1922 |
| 760.... 08D4  | 2040 ... 1C8D |
| 920.... 0B98  | 3055 ... 1FEE |
| 1100 ... 0E71 | 11500 .. 22A9 |
| 1260 ... 111B | END ... 25F3  |

The listing:

```

10 ' THE MEMORY BUILDER
20 ' A LEARNING GAME BY
30 ' JIM SCHMIDT
40 ' 196A ARLENE CT.
50 ' WHEELING, IL.
60 ' 60090
62 CLS0
63 POKE280,PEEK(275)
64 CLEAR1000
65 GOSUB10000
67 GOTO30000
70 GOSUB 1980
80 ' ENTRY FOR RERUN
90 CLS0
100 GOSUB2200:PRINT@128, " WAN
T INSTRUCTIONS? - <Y/N)":POKE115
2,DB:POKE1183,DB
110 A$=INKEY$:IF A$="" THEN 110
120 IF A$="Y" THEN GOSUB 750
130 CLS0:GOSUB2200:PRINT@128, "
NUMBER OF STRINGS (1-9)":POKE
1152,DB:POKE1183,DB
140 AI$=INKEY$:IF AI$="" THEN140

```

(Mr. Schmidt is a professional in data processing. Currently, he is a Senior System Analyst and specializes in financial/business software and systems development.)

### SPECTRAN

--SPECTACULATOR TO ASCII--



--ASCII TO SPECTACULATOR--

Use Your Word Processing Program  
To Include Spectaculator Tables In Your  
Reports

Run Spectaculator On Data Files Created  
Outside Of Spectaculator

Spectran is a easy to use program for unleashing the power of Disk Spectaculator. ML makes it quick. Works with ASCII compatible WP programs on 16K or 32K Disk systems. Use spreadsheet tables in your reports. Use downloaded data in Spectaculator. Easy to follow manual with examples. On diskette for \$25.00 postpaid.

### DISK UTILILTY PACKAGE

#### DIRDUPL -

Simple program for protecting and restoring many bombed diskettes.

#### DISKLOOK -

- > Disk utility program to examine and change data bytes on diskettes.
- > File analysis.
- > List granules allocated to a disk file.
- > Alter Directory contents.
- > Simultaneous listing of diskette data contents in ASCII and HEX formats.
- > User friendly.

The DISK UTILITY PACKAGE including DIRDUPL, DISKLOOK, and manuals on diskette for \$15.00 postpaid.

### INTRODUCTORY OFFER!

For a limited time, if you order Spectran at \$25.00 we will include the DISK UTILITY PACKAGE and manuals at no extra cost. Now that's a bargain!

CRIMSON SOFTWARE  
The RESEARCH ASSOCIATES Group  
32 Beverly Heights  
Tuscaloosa, Alabama 35404



# CoCo Warehouse

**NOW THE BEST IS  
EVEN BETTER!**

## MASTER CONTROL II from Soft Sector Marketing

The best doesn't always cost more and MASTER CONTROL is a good example. What would you be willing to pay for a program that would cut your typing time by more than 50% and eliminate hours of debugging because you misspelled a command word? For example the command STRINGS (requires nine strokes, with MASTER CONTROL II you only require two strokes. Just hit the down arrow key twice and it's done, and no mistakes. That is just one of the 50 pre-programmed commands available to you. If that isn't enough you also have the ability to customize your own key to enter a statement or command, correctly, automatically every time. But that's not all, how about automatic line numbering. Just enter the starting number and the increment you want and MASTER CONTROL II will do it for you. You also have direct control of MOTOR, AUDIO and TRACE plus a direct RUN key. Sounds great? Well thousands of color computer owners have been enjoying these features for years. But now the new MASTER CONTROL II also has the following features:

- \* New plastic overlay that can be removed when you are not using MASTER CONTROL II.
- \* New documentation, to help you get the most from the program.
- \* New repeating keyboard.
- \* New-now loads to disk with appropriate disk commands.

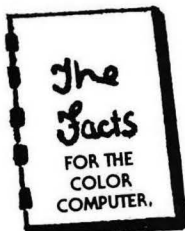
List price \$19.95

**Introductory price \$17<sup>88</sup>**

Plus \$2.50 Shipping & Handling

SAVE A BUCK...Order the NANOS Color Basic and Extend pocket card with your MASTER CONTROL II and you get this \$4.95 value for only \$3.95 extra. (NANOS pocket card not sold separately.)

166  
PAGES



only  
\$14.95  
plus \$2.50  
shipping

A MUST BOOK  
for the  
Color  
computer  
owner!  
•  
Schematics  
•  
Spec  
Sheets

### ORDER YOUR COPY TODAY!

The first document to provide information that will allow the user to take advantage of all the features of the Color Computer. Aimed at the machine language user.

The FACTS attempts to explain, and describes in detail, how the user can make use of the computers internal features. Divided into two sections: Hardware and software; the primary emphasis is on hardware capabilities and circuits. Provides detailed explanations of all the internal large scale integrated circuits.

## SPECIALS DONKEY KING by Tom Mix Software

Exciting sound-Realistic graphics. Never before have you seen a game like this for your CoCo. Four graphic screens just like the actual arcade games.

Requires 32K

TAPE...\$19.95

IF YOU DON'T HAVE 32K ORDER THE RAM SLAM. THIS SIMPLE KIT TO UPGRADE YOUR COCO TAKES LESS THAN 30 MINUTES TO INSTALL. NO SOLDERING REQUIRED...  
only \$49.95

## KEYS of the WIZARD

By Spectral Associates

Keys of the Wizard is a fast-action. Machine language adventure game filled with tricks, traps, treasures and creatures all of which are randomized at the beginning of each adventure so that no adventure will ever be exactly the same. Three different skill levels to choose from. Cassette only.

Reg. \$19.95 ..... \$16.95

## MAGIC BOX

By Spectral Associates

Magic Box is a special purpose utility designed to load TRS-80 Model I and III 50 Baud Basic programs into the Color Computer. Makes available a wide selection of software. Magic Box DOES NOT convert Machine language programs. Requires 16K Extended BASIC.

Reg. \$24.95 ..... \$21.95

## DOODLE BUG

by Computerware

You must hustle your lady bug through an intricate maze of barriers and turnstiles, while trying to earn points by eating all the dots, letters and hearts. Enemy bugs buzz after you and you must avoid the skulls! Exquisite sound adds to the excitement. A must game for anyone who enjoys fun and a challenge.

Cassette...\$21.21

## ARCADE GAMES

**KATERPILLAR ATTACK** by Tom Mix Software. Katerpillar is a fast-paced arcade game. Machine language. Requires joysticks.

Cassette only ..... \$24.95

**GHOST GOBLER** by Spectral Associates This is an excellent version of the popular arcade game of PAC-MAN. You control maze with the right joystick. Requires Extended BASIC.

Cassette only ..... \$21.95

**WAR KINGS** by Tom Mix Software

Shield your castle from cannonball attacks and deflect them towards your opponent's castle. Machine language, Ext. BASIC. Requires joysticks.

Cassette only ..... \$19.95

**HAYWIRE** by Mark Data

Have fun zapping robots with fast paced action combined with dynamite sound effects and super Hi-Res graphics. For one or two players.

Cassette only ..... \$24.95

**GALAX ATTAX** by Spectral Associates

Under a constant barrage of enemy fire you protect your ground base by shooting alien fighters. Use the right joystick to control the motion of your ship and right fire button to fire.

Cassette only ..... \$21.95

**BATTLEFLEET** by Spectral Associates

This grown-up version of Battleship is the toughest thinking game available. There is no luck involved as you seek out the computers hidden fleet.

Cassette only ..... \$14.95

**CAVE HUNTER** by Mark Data Products

Fast-paced action for the Color Computer. Super Hi-Res graphics, dynamite sound effects. This game will astonish you with its detail and quality.

Cassette only ..... \$24.95

**SPACE TRADERS** by Spectral Associates Space Traders is a fast moving galactic trading game for the Color Computer. Requires Ext. BASIC.

Cassette only ..... \$14.95

## TYPING TUTOR

This personal typing teacher allows you to learn at your own pace whether a beginner or just a little rusty. 16K

Cassette...\$19.95

WRITE FOR OUR CATALOG  
SEND ORDERS TO  
500 N. Dobson • Westland, MI 48185  
Phone (313) 722-7957

**HOW TO ORDER BY MAIL:** For prompt and courteous shipment, SEND MONEY ORDER, CERTIFIED CHECK, CASHIERS CHECK, MASTERCARD/VISA (include card number, inter-bank No., expiration date and signature) PERSONAL AND BUSINESS CHECKS MUST CLEAR OUR BANK BEFORE PROCESSING. Shipping and packaging charge of \$2.50 minimum must be added to all orders in continental U.S. (Canadian order \$5.00 minimum) Michigan residents include 4% sales tax 10% deposit required on C.O.D. orders.

```

150 SOUND234,1:A=VAL(AI$)
160 IF A=0 THEN PRINT"
CAN'T BE ZERO":SOUND7,7:FOR LO=1
 TO 100:NEXT:GOTO 130
165 IFA>5THENPRINT"
170 CLS0:GOSUB2200:PRINT@128,"
 LENGTH OF STRINGS <1-9> ":POK
E1152,DB:POKE1183,DB
180 BI$=INKEY$:IFBI$="" THEN 180
190 SOUND234,1:B=VAL(BI$)
200 IF B=0 THEN PRINT"
CAN'T BE ZERO":SOUND7,7:FOR LO=1
 TO 100:NEXT:GOTO 170
210 CLS0:GOSUB2200:PRINT@128,"
DIFFICULTY LEVEL <TIME><1-5>":PO
KE1152,DB:POKE1183,DB
220 CI$=INKEY$:IFCI$="" THEN 22
0
230 SOUND234,1:C=VAL(CI$)
240 IF C=0 THEN PRINT"
CAN'T BE ZERO":SOUND7,7:FOR LO=1
 TO 100:NEXT:GOTO 210
242 IF C>5 THEN PRINT" YOU
MUST BE KIDDING!!!":SOUND7,7:FOR
 LO=1TO100:NEXT:GOTO210
250 C=900/C
260 GOSUB 330

```

```

270 CLS0
280 PRINT@32," PRESS SPACE BAR
 WHEN READY"
290 PRINT@140,"ready ??"
292 PRINT@148,STRING$(11,CHR$(14
4)):POKE1183,144:POKE1169,144
300 GOSUB2200
310 A$=INKEY$:IF A$="" THEN 310
320 GOTO 490
330 NO$="Y":GOSUB9000:DIM AA$(A)
:DIM ZZ$(A)
340 DATA A,B,C,D,E,F,G,H,I,J,K,L
,M,N,O,P,Q,R,S,T,U,V,W,X,Y,Z
350 FOR I=1TOA
360 FOR K=1TOB
370 D=RND(26)
380 FOR J=1TOD
390 READ BB$
400 NEXT
410 RESTORE
420 AA$(I)=AA$(I)+BB$
430 PRINT@128-32,"PLEASE WAIT...
"
440 SOUND234,1
450 PRINT@128,"I'M GETTING MY ST
UFF TOGETHER."
460 NEXT:NEXT
470 RETURN
480 CLS
490 FOR L=1TOA
493 PRINT@224,">>>>>>>>>>"
500 PRINT@235,AA$(L)
503 PRINT@246,"<<<<<<<<<<<"
510 FOR M=1TOC:NEXT
515 SOUND245,1
516 PRINT@225,STRING$(30,255)
520 NEXT
530 SOUND 200,1:SOUND200,1
540 CLS0:PRINT" ANSWER TI
ME !!!!!"
550 PRINT "ENTER STRINGS ONE AT
A TIME AND <ENTER> AFTER EACH"
560 FORAZ=1TOA
570 INPUTZZ$(AZ)
580 IF AA$(AZ)><ZZ$(AZ) THENGOSU
B9000:SOUND134,7:SOUND2,24:PRINT
"YOU MISSED IT...":PRINT"YOU ENT
ERED ";ZZ$(AZ);" SHOULD BE "AA$(
AZ):R=R+1:GOTO 690
590 NEXT
600 GOSUB 9000
610 PRINT@96," ALL STRINGS ARE
CORRECT !!!!!"
620 SOUND 69,2:SOUND 111,9
630 SOUND 69,2:SOUND 111,9
640 SC=(A*2)+(B*3)+(VAL(CI$)*4)*
10
650 PRINT@160,"YOUR SCORE IS ";S
C
660 PRINT""

```

Introducing - MORE Quality Software by MSI.

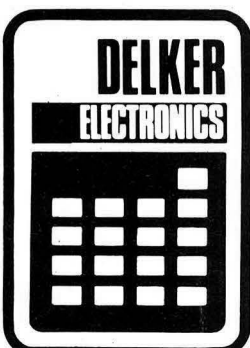
Featuring \* COLOR FINANCE for the Color Computer - 32k Ext. Disk req'd. \$59.95

Features include:

- \* User Friendly - No programming knowledge required
- \* Fully documented/Easy to use
- \* Maintain up to 21 Asset, 21 Liability, and 54 Expense Accounts
- \* Print Options (Account Statements, Budgets, Trial Balance, & MORE!)
- \* Backup/Restore To Cassette Tape
- \* Large 42 x 32 screen display
- \* Sample Session Included for Fast and Easy Instruction.

ONLY \$59.95  
exclusively from  
Delker Electronics, Inc.

(Dealer Inquiries welcome)  
Delker Electronics, Inc.  
P.O. Box 897  
Dept D  
Smyrna, TN 37167  
800-251-5008  
615-459-2636 (Tennessee)





# READ THE FINE PRINT.

## It's worth your time. This is good stuff.

### SYSTEMS SOFTWARE

#### MACRO-80C

This is a disk-based editor, macro assembler and monitor, written for Color Computer by Andy Phelps. THIS IS IT — The ultimate programming tool!

The powerful 2-pass macro assembler features conditional assembly, local labels, include files and cross referenced symbol tables. MACRO-80C supports the complete Motorola 6809 instruction set in standard source format. There are no changes, constraints or shortcuts in the source language definition. Incorporating all of the features of our Rompack-based assembler (SDS80C), MACRO-80C contains many more useful instructions and pseudo-ops which aid the programmer and add power and flexibility.

The screen-oriented text editor is designed for efficient and easy editing of assembly language programs. The "Help Key" feature makes it simple and fun to learn to use the editor. As the editor requires no line numbers, you can use the arrow keys to position the cursor anywhere in the file. MACRO-80C allows global changes and moving/copying blocks of text. You can edit lines of assembly source which are longer than 32 characters.

DCBUG is a machine language monitor which allows examining and altering of memory, setting break points, etc.

The editor, assembler and monitor — as well as sample programs — come on one Radio Shack compatible disk. Extensive documentation included. **MACRO-80C Price: \$99.95**

#### SOFTWARE DEVELOPMENT SYSTEM

The Micro Works Software Development System (SDS80C) is a complete 6809 editor, assembler and monitor package contained in one Color Computer program pack! Vastly superior to RAM-based assemblers/editors, the SDS80C is non-volatile, meaning that if your application program bombs, it can't destroy your editor/assembler. Plus it leaves almost all of 16K or 32K RAM free for your program. Since all three programs, editor, assembler and monitor are co-resident, we eliminate tedious program loading when going back and forth from editing to assembly and debugging!

The powerful screen-oriented Editor features finds, changes, moves, copies and much more. All keys have convenient auto repeat (typamatic), and since no line numbers are required, the full width of the screen may be used to generate well commented code.

The Assembler features all of the following: complete 6809 instruction set; conditional assembly; local labels; assembly to cassette tape or to memory; listing to screen or printer; and mnemonic error codes instead of numbers.

The versatile monitor is tailored for debugging programs generated by the Assembler and Editor. It features examine/change of memory or registers, cassette load and save, breakpoints and more. **SDS80C Price: \$89.95**

#### MICRO WORKS COLOR FORTH

- Forth is faster to program in than Basic
- Forth is easier to learn than Assembly Language
- Forth executes in less time than Basic

Forth is a highly interactive language like Basic, with structure like Pascal and execution speed close to that of Assembly Language. The Micro Works Color Forth is a Rompack containing everything you need to run Forth on your Color Computer.

Color Forth consists of the standard FORTH Interest Group (FIG) implementation of the language plus

most of FORTH-79. It has a super screen editor with split screen display. Mass storage is on cassette. Color Forth also contains a decompiler and other aids for learning the inner workings of this fascinating language. It will run on 4K, 16K, and 32K computers. Color Forth contains 10K of ROM, leaving your RAM for your programs! There are simple words to effectively use the Hi-Res Color Computer graphics, joysticks, and sound. The 112-page manual includes a glossary of the system-specific words, a full standard FIG glossary and complete source listing. **COLOR FORTH ... THE BEST!** From the leader in Forth, Talbot Microsystems. **Price: \$109.95**

#### MICROTEXT: COMMUNICATIONS VIA YOUR MODEM!

Make your Color Computer an intelligent printing terminal with off-line storage! The Microtext module is just what you'll need for:

- Talking to a timeshare system or information service
- Printing out what is received as it is received
- Saving received text to cassette tape
- Re-displaying the received text even while on-line
- Communications with other computers
- Using your computer as a general-purpose 300-baud terminal
- Downloading programs from other computers

The Microtext module is a program pack containing not only firmware but a second serial port so that both your printer and modem can be connected at the same time. Microtext can be configured for any serial printer that will work with the Color Computer, even if it requires line feeds! But even if you don't have a printer, you can keep a permanent copy of your data by storing to cassette tape. Also, any Radio Shack/Centronics-compatible parallel printer may be used by adding the Micro Works' P180C parallel interface.

For those of you with special terminal applications, Microtext has selectable parity; it sends odd, even, mark or space. With mark parity (which is default) you can send to computers requiring either seven or eight bits. All 128 ASCII codes can be sent. Exchange programs with other Color Computer users! Basic programs may be downloaded from other computers or timesharing systems.

You'll find many uses for this versatile module! Available in ROMPACK, ready-to-use, for **\$59.95**.

#### MACHINE LANGUAGE

**MONITOR TAPE:** A cassette tape which allows you to directly access memory, I/O and registers with a formatted hex display. Great for machine language programming, debugging and learning. It can also send/receive RS232 at up to 9600 baud, including host system download/upload. 19 commands in all. Relocatable and reentrant. **CBUG Tape Price: \$29.95**

**MONITOR ROM:** The same program as above, supplied in 2716 EPROM. This allows you to use the entire RAM space. And you don't need to re-load the monitor each time you use it. The EPROM plugs into the Extended Basic ROM Socket or the Romless Pak I. **CBUG ROM Price: \$39.95**

**SOURCE GENERATOR:** This package is a disassembler which runs on the color computer and generates your own source listing of the BASIC interpreter ROM. Also included is a documentation package which gives useful ROM entry points, complete memory map, I/O hardware details and more. A 16K system is required for the use of this cassette. **80C Disassembler Price: \$49.95**

### BOOKS

*6809 Assembly Language Programming*, by Lance Leventhal, **\$16.95**

*TRS-80 Color Computer Graphics*, by Don Inman, **\$14.95**

*Assembly Language Graphics for the TRS-80 Color Computer*, by Don Inman, **\$14.95**

*Starting Forth*, by L. Brodie, **\$19.95**

### GAMES

**Star Blaster** — Blast your way through an asteroid field in this action-packed Hi-Res graphics game. Available in ROMPACK; requires 16K. **Price: \$39.95**

**Pac Attack** — Try your hand at this challenging game by Computerware, with fantastic graphics, sound and action! Cassette requires 16K. **Price: \$24.95**

**Haywire** — Have fun zapping robots with this Hi-Res game by Mark Data Products. Cassette requires 16K. **\$24.95**

**Dunkey Munkey** — Arcade excitement awaits those who dare to conquer the Munkey! Joystick and 32K required, by Intellectronics. Cassette: **\$24.95**

**Colorpede** — Great graphics, two-player option, and pause control in this exciting game by Intracolor Communication. Cassette requires 16K: **\$29.95**

**Adventure** — *Black Sanctum* and *Calixto Island* by Mark Data Products. Each cassette requires 16K: **\$19.95** each.

**Cave Hunter** — Experience vivid colors, bizarre sounds and eerie creatures in hot pursuit as you wind your way through a cave maze in search of gold treasures. This exciting Hi-Res game by Mark Data Products requires 16K for cassette version. **\$24.95**

**Starfire** — Fly around the planet defending Earthlings from being snatched up by aliens in this challenging game from Intellectronics. Cassette requires 16K: **\$21.95**

**Doodle Bug** — Joystick-controlled Doodle Bugs must move quickly through mazes while being chased by enemy bugs in Hi-Res game by Computerware. Cassette requires 16K: **\$24.95**

**Astro Blast** — You'll need to act fast as you protect Earth from wave after wave of alien invaders in this Hi-Res game by Mark Data. Cassette requires 16K: **\$24.95**

### HARDWARE

**PARALLEL PRINTER INTERFACE** — Serial to parallel converter allows use of all standard parallel printers. P180C plugs into the serial output port, leaving your Rompack slot free. You supply the printer cable. **P180C Price: \$69.95**

**MEMORY UPGRADE KITS:** Consisting of 4116 200ns., integrated circuits, with instructions for installation. **4K-16K Kit Price: \$39.95. 16K-32K Kit** (requires soldering experience) **Price: \$39.95.** For Rev. level E, ET, NC and TDP-100s, we carry 64K chips; upgrading is easy! Eight prime **64K chips** and instructions: **\$64.95**

**Romless Packs** for your custom EPROMs — call or write for information.

THE **MICRO WORKS**

MasterCharge/Visa Accepted  
California residents add 6% tax.

P.O. BOX 1110, DEL MAR, CA 92014 (619) 942-2400

```

670 PRINT@224,"C O N G R A T U L
A T I O N S ! "
680 GOTO 710
690 PRINT"":PRINT"PROGRESS IS...
CONTINUOUSLY TRYING."
700 PRINT"DEFEAT IS... NOT TRYIN
G."
710 PRINT""
720 PRINT"AGAIN? <Y/N>"
730 S$=INKEY$:IF S$="" THEN 730
740 IF S$="Y" THEN RUN 80 ELSE
GOTO 15000
745 END
750 '
760 CLS:CG=1:GOTO2200
765 PRINT" ***MEMORY***"
766 GOSUB 8000
770 PRINT" IT HAS BEEN KNO
WN"
775 GOSUB 8010
780 PRINT" FOR SOME TIME THA
T"
785 GOSUB 8020
790 PRINT" WHAT WE CALL MEMO
RY"
795 GOSUB 8030
800 PRINT" IS REALLY TWO VER
Y"
805 GOSUB 8040
810 PRINT" DIFFERENT FUNCTIO
NS."

```

```

815 GOSUB 8050
820 PRINT" CALLED SHORT TERM
AND"
825 GOSUB 8060
830 PRINT" LONG TERM MEMORY,
THESE"
835 GOSUB 8070
840 PRINT" TWO ABILITIES CAN
NOT"
845 GOSUB 8080
850 PRINT" ONLY BE TRAINED,
BUT "
855 GOSUB 8090
860 PRINT" CAN ACTUALLY BE M
ADE TO"
865 GOSUB 8100
870 PRINT" ACHIEVE SOME VERY
"
875 GOSUB 8110
880 PRINT" REMARKABLE RESULT
S IF"
885 GOSUB 8120
890 PRINT" YOU ARE WILLING T
O TRY."
895 GOSUB 8130
900 PRINT" <ANY KEY>"
905 GOSUB 8140
915 GOSUB 8150
920 GL$=INKEY$:IF GL$="" THEN 92
0
930 CLS:PRINT"":CG=2:GOTO2200
940 PRINT" IT IS NOT A MA
TTER "
945 GOSUB 8000
950 PRINT" OF INTELLIGENCE.
WE "
955 GOSUB 8010
960 PRINT" ALL HAVE THE NECE
SSARY"
965 GOSUB 8020
970 PRINT" EQUIPMENT. IT IS
"
975 GOSUB 8030
980 PRINT" MOSTLY A MATTER O
F "
985 GOSUB 8040
990 PRINT" EFFORT AND TRAINI
NG."
995 GOSUB 8050
1000 PRINT" HOW MUCH EFFORT
IS,"
1005 GOSUB 8060
1010 PRINT" OF COURSE, UP TO
YOU."
1015 GOSUB 8070
1020 PRINT" THE MORE YOU TRY
THE "
1025 GOSUB 8080
1030 PRINT" BETTER YOUR MEMO
RY WILL "

```

## DISK ZIPPER

COLOR DISK UTILITY PACKAGE

A MENU DRIVEN SYSTEM DISK CONTAINING:

ERROR CRASHLESS BACKUP: DUAL AND SINGLE DRIVE  
WRITE OR READ ANY SECTOR: CHECK DISK FOR ERRORS  
PAGE DISK THROUGH ANY PMODE WINDOW IN COLOR  
DUMP DISK IN HEX OR ASCII: PRINTER SUPORTED  
LOAD ML TAPE TO DISK: RELOCATES UNLOADABLES  
WITH COMPLETE MANUAL: REQ32K RS DISK  
ONLY **24.95**

### ARCADE - CONTROLS!

WICO MADE JOYSTICK INTERFACE: TWIN STICKS  
ALLOWS ANY TWO JOYSTICKS TO WORK ON THE  
COLOR COMPUTER: ONLY **19.95**



ACC-U-FIRE PADDELS / ATARI-TYPE GAME PADDELS PLUG INTO COLOR -  
COMPUTER FOR IMPROVING SCORES! WORKS ON HOR. & VERT. GAMES.  
ONLY \$19.95!

### HARDWARE!

ROMPACK EXTENDER: PUT YOUR DISKPACK  
WHERE YOU WANT IT: 3 FEET LONG  
QUALITY CABLE ONLY **27.00**



GREEN - PHOSPHOR ADAPTER / NOW PRINT GREEN ON BLACK SCREEN!  
ALL HARDWARE, NO SOFTWARE! NO SOLDERING! AND ONLY \$19.95!

WORKS ON ANY TV: SMALL BOARD GOES ON THE  
RF SHIELD: ONLY THREE WIRE CLIPS  
**EPROM PROGRAMING! 2K, 4K, 8K BYTES**  
WE WILL PROGRAM YOUR EPROM FOR **5.00**  
SEND US ONE OF YOUR GAMEPACKS AND WE WILL PUT YOUR  
PROGRAM IN IT FOR ONLY **20.00**

CALL OR WRITE FOR DETAILS

YOU CAN PRINT VIDTEX FROM ROMPACK

WICO COMMAND CONTROL STICK **28.00** OUR SOFTWARE ALLOWS YOU TO  
WICO REDBALL STICK **34.00** PRINT OFF LINE FROM VIDTEX  
WICO TRACKBALL **68.00** WITH SERIAL Y CABLE: 29.95  
ATARI JOYSTICKS \$6.95/ WITHOUT CABLE: 9.95

WE CARRY TOM-MIX & MARK-DATA.

ZAXXON: DATASOFT: **34.85**

DONKEY KING..... \$24.95

PROTECTORS..... 24.95

ASTRO-BLAST..... 24.95

SPACE RAIDERS..... 24.95

MOON-LANDER EB. 19.95

HAYWIRE..... 24.95

**MICRO-DIV.** Toledo, Ohio 43612  
450 W. LASKEY 1-419-476-6282

ASK FOR MICRO-DIV.

C.O.D. Credit Card  
orders accepted / add \$2.00 shipping



# Introducing . . .

**New! From the Programmer's Guild**

## **NINJA WARRIOR™**

### **The Ultimate Arcade Challenge!**

New from Arcade Master Charles Forsythe!

The most original game ever produced!

16 levels of breath taking action!

Up to 6 players in competition!

Keyboard or joystick control.

Runs on any 16K TRS-80 color or TDP 100.

Guide your Ninja through boulders, fire, pitfalls, flaming meteors, and Ninja masters to attain the ultimate achievement in — NINJA GRANDMASTER!

**NINJA WARRIOR™** is the single most difficult arcade game ever written!

Exciting—Frustrating—Difficult—Impossible — your skill will tell the tale.

**NINJA WARRIOR™** — for those who would face the ultimate arcade challenge—

## **TO WIN OR DIE!**

\$29.95 cassette  
Free Shipping  
VISA MASTERCARD

THE PROGRAMMER'S GUILD  
P.O. BOX 66  
PETERBOROUGH, NH 03458  
—or Call (603) 924-6065 for COD—

**AND GET "FREE" SHIPPING ANYWHERE ON THE  
PLANET EARTH OR HER COLONIES**

```

1035 GOSUB 8090
1040 PRINT" GET. YOUR SHORT
 TERM"
1045 GOSUB 8100
1050 PRINT" MEMORY IS THE ON
E THAT"
1055 GOSUB 8110
1060 PRINT" CAN MOST BE IMPR
OVED."
1065 GOSUB 8120
1070 PRINT" <ANY KEY>"
1075 GOSUB 8130
1077 GOSUB 8140
1080 GOSUB 8150
1090 GL$=INKEY$:IFGL$="" THEN 10
90
1100 CLS:PRINT"":CG=3:GOTO2200
1110 PRINT" BY UTILIZING
ONE "
1115 GOSUB 8000
1120 PRINT" OF THE FAVORITE
TRAINING"
1125 GOSUB 8010
1130 PRINT" METHODS USED BY
THE"
1135 GOSUB 8020
1140 PRINT" RESEARCHERS IN T

```

```

 HIS "
1145 GOSUB 8030
1150 PRINT" FIELD, THE TIMED
"
1155 GOSUB 8040
1160 PRINT" SEQUENCE/RANDOM
GROUP"
1165 GOSUB 8050
1170 PRINT" LETTERS METHOD,
YOU"
1175 GOSUB 8060
1180 PRINT" CAN POTENTIALLY
IMPROVE"
1185 GOSUB 8070
1190 PRINT" YOUR MEMORY AS F
AR AS"
1195 GOSUB 8080
1200 PRINT" YOU ARE WILLING
TO GO."
1205 GOSUB 8090
1210 PRINT" AND, YOU CAN HAV
E SOME"
1215 GOSUB 8100
1220 PRINT" FUN DOING IT WHI
LE YOU"
1225 GOSUB 8110
1230 PRINT" CHART YOUR PROGR
ESS.
1235 GOSUB 8120
1240 PRINT" <ANY KEY>"
1245 GOSUB 8130
1246 GOSUB 8140
1250 GOSUB 8150
1260 GL$=INKEY$:IFGL$="" THEN 12
60
1270 CLS:PRINT"":CG=4:GOTO2200
1280 PRINT" THIS PROGRAM
WILL"
1285 GOSUB8000
1290 PRINT" PROVIDE YOU WITH
"
1295 GOSUB8010
1300 PRINT" VARYING LENGTH S
TRINGS"
1305 GOSUB8020
1310 PRINT" OF RANDOM LETTER
S AT"
1315 GOSUB8030
1320 PRINT" VARYING SPEEDS.
YOU"
1325 GOSUB8040
1330 PRINT" CONTROL THE LENG
TH AND"
1335 GOSUB8050
1340 PRINT" SPEED. YOU ALSO
CAN"
1345 GOSUB8060
1350 PRINT" SELECT THE NUMBE
R OF"
1355 GOSUB8070

```

# AUTO-DIALER

## BY SOUNDWORKS

- AUTOMATIC PHONE DIALER
- ULTRA HIGH SPEED DIALING AND REDIALING
- STORE OVER 50 NUMBERS
- NO MODEM REQUIRED
- NO TONE SERVICE NEEDED
- SIMPLE HOOK - UP
- ADAPTABLE TO ANY PHONE
- 16K EXTENDED REQUIRED

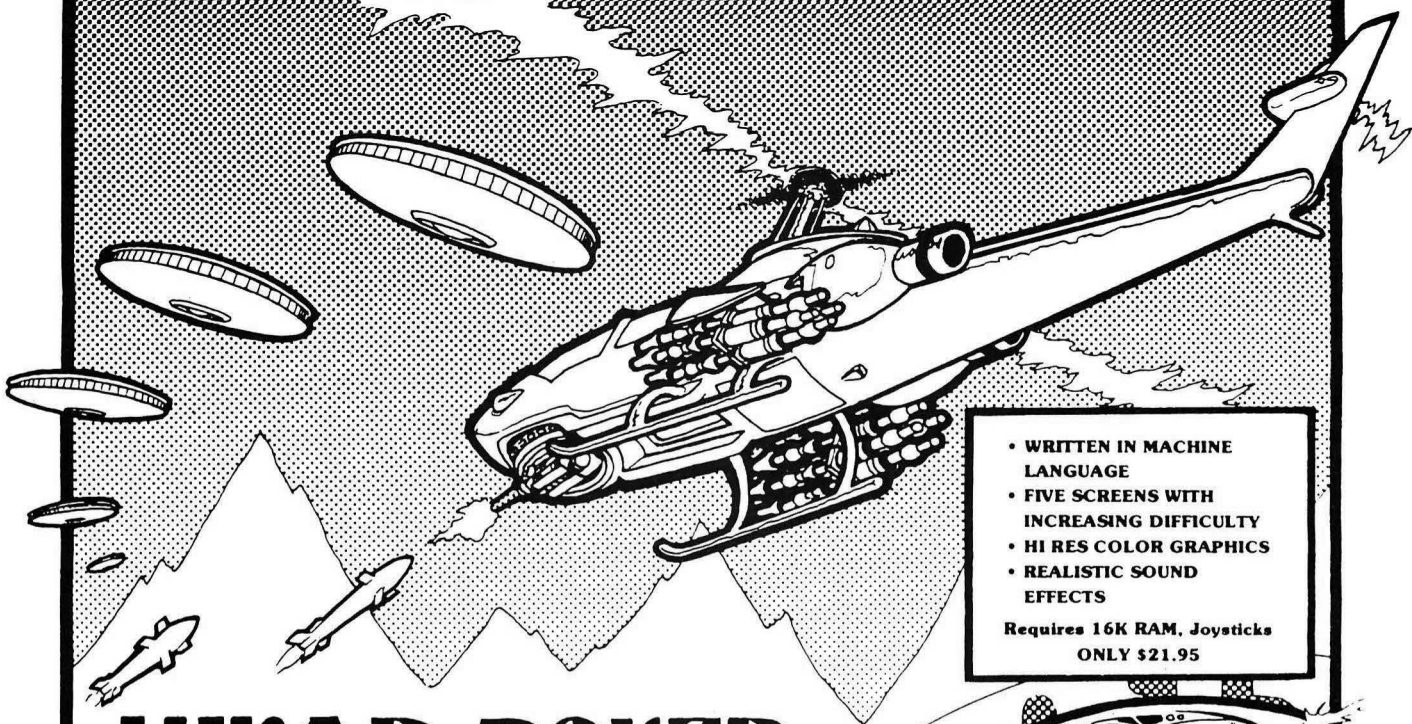
CASSETTE \$24.95 DISK \$34.95

Soundworks Productions  
 26 EAST 7th STREET  
 PATCHOGUE, NEW YORK 11772

N.Y.S. RESIDENTS: ADD 7.25% TAX



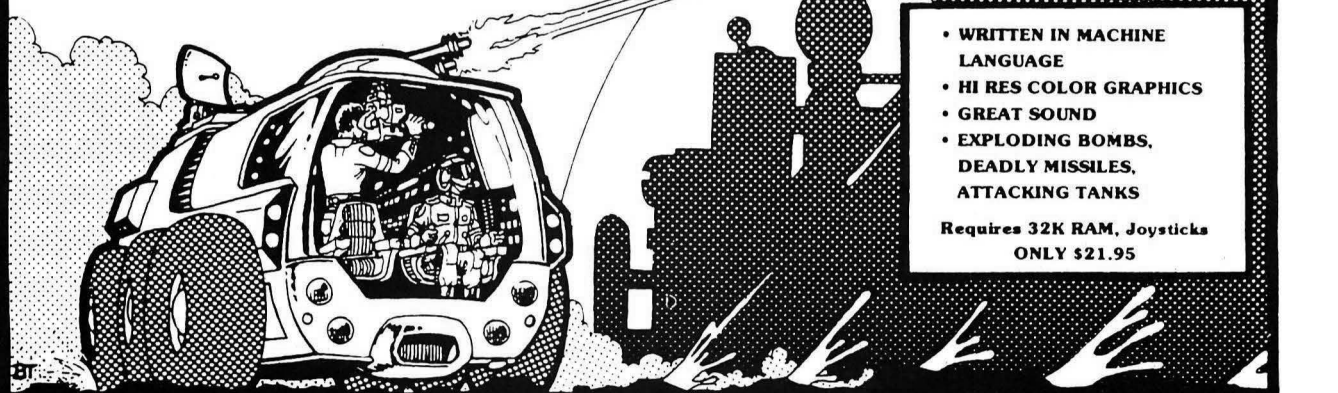
# WHIRLYBIRD RUN



- WRITTEN IN MACHINE LANGUAGE
- FIVE SCREENS WITH INCREASING DIFFICULTY
- HI RES COLOR GRAPHICS
- REALISTIC SOUND EFFECTS

Requires 16K RAM, Joysticks  
ONLY \$21.95

# LUNAR-ROVER PATROL



- WRITTEN IN MACHINE LANGUAGE
- HI RES COLOR GRAPHICS
- GREAT SOUND
- EXPLODING BOMBS, DEADLY MISSILES, ATTACKING TANKS

Requires 32K RAM, Joysticks  
ONLY \$21.95

**LUNAR-ROVER PATROL** - Guide your Lunar Rover along the moon's surface following every bump and crevice as a barrage of obstacles hinder your movement. No MOON-PATROL type features left out of this game.

**WHIRLYBIRD RUN** - Your mission is to reach and destroy the enemy base hidden deep within the Tunnel of Doom encountering missiles, saucers, and deadly gas clouds along the way. If you like SCRAMBLE, you will love WHIRLYBIRD RUN.

For Orders Only  
**1-800-426-1830**  
except WA, AK, HI

We accept VISA, MASTERCARD, AMERICAN EXPRESS.  
Add 3% for shipping. NO C.O.D.  
All prices U.S. FUNDS.  
WA residents add 7.8% sales tax.

Call or write for a complete catalog  
Business Office and Information Call:  
..... (206) 581-6938  
Office open 8:30-4:30 P.S.T.

**SPECTRAL ASSOCIATES**

3416 South 90th Street  
Tacoma, WA 98409

**DEALER INQUIRIES INVITED**

1360 PRINT" STRINGS DISPLAYE  
D."  
1365 GOSUB8080  
1370 PRINT" BECAUSE THE GROU  
P"  
1375 GOSUB8090  
1380 PRINT" DISPLAY IS RANDO  
M, IT"  
1385 GOSUB8100  
1390 PRINT" WILL OCCASIONALL  
Y COME"  
1395 GOSUB8110  
1400 PRINT" UP WITH A REAL W  
ORD."  
1405 GOSUB8120  
1410 PRINT" <ANY KEY>"  
1415 GOSUB8130  
1417 GOSUB8140  
1420 GOSUB8150  
1430 GL\$=INKEY\$:IFGL\$="" THEN 14  
30  
1440 CLS:CG=5:GOTO2200  
1450 PRINT" THIS WORD MAY  
BE A"  
1455 GOSUB8000  
1460 PRINT" NAUGHTY WORD. I  
F THIS"  
1464 GOSUB8010  
1470 PRINT" IS OF CONCERN, R

EMOVE"  
1475 GOSUB8020  
1480 PRINT" THE VOWELS FROM  
THE "  
1485 GOSUB 8030  
1490 PRINT" DATA STATEMENT A  
ND"  
1495 GOSUB 8040  
1500 PRINT" CHANGE THE NUMBE  
RS"  
1505 GOSUB 8050  
1510 PRINT" IN THE RND & FOR  
TO 21."  
1515 GOSUB 8060  
1520 PRINT" (LINES 340, 370  
& 2210)."  
1525 GOSUB 8070  
1530 PRINT" YOU SHOULD START  
OFF"  
1535 GOSUB 8080  
1540 PRINT" WITH A FEW SHORT  
"  
1545 GOSUB 8090  
1550 PRINT" STRINGS AT A SLO  
W SPEED"  
1555 GOSUB 8100  
1560 PRINT" AND INCREASE BOT  
H THE"  
1565 GOSUB 8110  
1570 PRINT" LENGTH OF THE ST  
RINGS"  
1575 GOSUB 8120  
1580 PRINT" AND THE SPEED AS  
YOU GO."  
1585 GOSUB 8130  
1590 PRINT" <ANY KEY>"  
1595 GOSUB 8140  
1600 GOSUB 8150  
1610 GL\$=INKEY\$:IFGL\$="" THEN 16  
10  
1620 CLS:PRINT"":CG=6:GOTO2200  
1630 PRINT" YOUR SHORT TE  
RM"  
1635 GOSUB8000  
1640 PRINT" MEMORY, AS AN AV  
ERAGE,"  
1645 GOSUB8010  
1650 PRINT" CAN HANDLE 7 ITE  
MS."  
1655 GOSUB8020  
1660 PRINT" BY USING 'GROUPS  
' "  
1665 GOSUB8030  
1670 PRINT" (STRINGS) OF LET  
TERS"  
1675 GOSUB8040  
1680 PRINT" YOU CAN REMEMBER  
LONGER"  
1685 GOSUB8050  
1690 PRINT" SEQUENCES. THIS



## GRAND SLAM BRIDGE



SHARPEN UP YOUR BRIDGE GAME. COM-  
PUTER BIDS YOUR PARTNER'S HAND AND  
PLAYS THE OPPONENT'S HANDS. RAN-  
DOM HANDS DEALT EACH TIME. CARDS,  
TRICKS, BIDS, AND CONTRACT SHOWN  
ON SCREEN.

32K

CASSETTE \$19.95



## STOCK OPTION STRATEGIES



DEVISE YOUR OWN STOCK OPTION STRAT-  
EGIES. COVERED OPTIONS, STRADDLES,  
CALLS, AND PUTS. % GAINS AND LOSSES  
VS. FUTURE STOCK PRICES GRAPHED IN  
COLOR. EASY TO USE, NO DATA BASE RE-  
QUIRED, JUST ENTER FROM KEYBOARD.  
MENU DRIVEN.

16K

CASSETTE \$14.95



SEND CHECK OR MONEY ORDER TO:

GREENTREE SOFTWARE  
P.O. BOX 97  
GREENWOOD, IN 46142





# THE UN-DISK



## UN-BELIEVABLE

But true! There is a disk drive in your Color Computer . . . and it is faster and more efficient than any "hardware" drive you can buy, for any price. This new "disk drive" is called VDOS—for Virtual Disk Operating System—and it will absolutely revolutionize the way you operate your CoCo.

VDOS lets you use the "extra" memory inside your CoCo as a virtual disk, with programs (any programs) stored out of the way. You can "save" and "load" programs from your in-memory

disk into working memory, and then run them. When you're done, you can simply access your in-memory disk again . . . and save or load another, and another.

And VDOS is fast. Because you are using memory rather than a mechanical device (like a disk drive or cassette player), programs load instantly. Yes, VDOS is faster than a disk!

VDOS works with all Color Computers—from 16K non-extended to 64K extended. Obviously, the

more memory you have, the greater number (and length) of programs you can store. For a 64K system, VDOS also uses the "unused" part of memory, providing up to 50,000 bytes of storage! Now, that's some disk!

We call it VDOS because in the future there will be utilities for your VDOS UNDISK that will give even greater capabilities—such as a full one-pass memory dump to cassette. Other utilities are planned, too.

We believe VDOS is the

greatest advancement for CoCo since the introduction of the disk drive itself. And, at less than \$100, it is so inexpensive you can't afford to be without it. If you have the "cassette blues," VDOS is the answer!

Finally, VDOS is simple to operate. It is entirely self-prompting and comes with a complete manual. But you almost don't even need the instructions—it requires absolutely no technical expertise.

VDOS. The answer to your prayers.

Cassette: \$97.50. Add \$1.50 shipping and handling; Canadians add \$5 for shipping; Foreign points add \$9. VISA and Master Card accepted. All Kentucky residents add 5% sales tax. Payments accepted in United States currency only.



Dr. Preble's Programs  
6540 Outer Loop  
Louisville, KY 40228  
(502) 241-6474  
Dealer Inquiries Invited



```

IS"
1695 GOSUB8060
1700 PRINT" BECAUSE, WITH PR
ACTICE,"
1705 GOSUB8070
1710 PRINT" YOUR MEMORY USES
THE "
1715 GOSUB8080
1720 PRINT" SAME 'SLOT' FOR
A "
1725 GOSUB8090
1730 PRINT" WHOLE GROUP AS F
OR A "
1735 GOSUB8100
1740 PRINT" SINGLE LETTER."
1745 GOSUB 8110
1750 PRINT" <ANY KEY>"
1752 GOSUB8120
1755 GOSUB8130
1757 GOSUB8140
1760 GOSUB8150
1770 GL$=INKEY$:IFGL$="" THEN 17
70
1780 CLS:PRINT"":CG=7:GOTO2200
1790 PRINT" SO IT IS NOT A
T ALL"
1795 GOSUB8000
1800 PRINT" IMPOSSIBLE TO EX
PAND"

```

```

1805 GOSUB8010
1810 PRINT" YOUR ABILITY TO
"
1815 GOSUB8020
1820 PRINT" REMEMBER 7 LETTE
RS TO"
1825 GOSUB8030
1830 PRINT" THE ABILITY TO R
EMEMBER"
1835 GOSUB8040
1840 PRINT" 7 GROUPS OF SAY
5 "
1845 GOSUB8050
1850 PRINT" LETTERS. YOU AR
E THEN"
1855 GOSUB8060
1860 PRINT" REMEMBERING 35 L
ETTERS"
1870 PRINT" WITH THE SAME ME
NTAL"
1880 PRINT" HORSEPOWER USED
FOR 7."
1890 PRINT" "
1895 GOSUB8070
1900 PRINT" HOW FAR CAN Y
OU GO ?"
1905 GOSUB8080
1910 PRINT" IF YOU ARE READY
TO TRY"
1915 GOSUB8090
1920 PRINT" GIVE ME A 'Y'"
1925 GOSUB8100
1926 GOSUB8110
1927 GOSUB8120
1928 GOSUB8130
1929 GOSUB8140
1930 GOSUB8150
1940 Q$=INKEY$:IF Q$="" THEN 194
0
1950 IF Q$="Y" THEN RETURN
1960 NO$="Y":GOSUB9000:PRINT@128
,"WELL, LET'S GET TOGETHER SOON.
.."
1970 END
1980 MM$="M E M O R Y"
1990 LC=491
2000 FOR JZ=1TO100
2010 PRINT@LC-11," ";M
M$
2020 LC=LC-32
2030 IF LC<32 THEN LC=491
2040 NEXT
2050 PRINT" M E M O
R Y"
2060 PRINT" M E M O
R Y"
2070 PRINT" M E M O
R Y"
2075 PRINT" M E M O
R Y"

```

## STAT'S

A STATISTICAL ANALYSIS PROGRAM, THAT CALCULATES-MEAN,--VARIANCE, AND STANDARD DEVIATION FOR BOTH SAMPLES OR POPULATION ALLOWS DATA STORAGE TO TAPE OR DISK. FULL COLOR GRAPHING OF FREQUENCY HISTOGRAM. ALLOWS EASY MODIFICATION OF STORED DATA, COMBINE TWO FILES, ETC. USER FRIENDLY! CASSETTE \$24.95

## COLOR GRAPHIC PRINTER UTILITIES

UTILITIES FOR RADIO SHACKS CGP-115,COLOR GRAPHIC PRINTER/PLOTTER WORD PROCESSOR--SUPPORTS IMBEDDED CONTROLS FOR PRINT SIZE AND COLOR RIGHT JUSTIFICATION. DESIGNED JUST FOR THE CGP-115 SCREEN PRINT PROGRAM---TRUE FOUR COLOR PRINT OUT, WORKS IN MODE 3 OR 4 YOU WON'T BELIEVE THE DETAILS DRAWING BOARD---ETCH-A-SKETCH FOR THE PRINTER. ANY COLOR, EASY CORRECTIONS CASSETTE \$24.95

## RELOCATE

RELOCATE MAKES AUTOMATIC TAPE COPIES OF ANY COLOR COMPUTER CARTRIDGE. ALLOWS CHANGES TO BE MADE TO THE PROGRAM SUCH AS (PRINT-OUT WIDTH, CHANGE BAUD RATE IN \*SCRIPIT, ECT.) REQUIRES EITHER A 84K MOD. OR A 10K OR LARGER COMPUTER WITH A CARTRIDGE MEMORY EXPANSION OF 4K OR LARGER. VERY EASY TO USE! ONCE FAMILIAR WITH THE PROGRAM, COPIES CAN BE MADE IN LESS THEN FOUR MINUTES CASSETTE \$24.95

## COMPUTERIZED ALARM SYSTEMS

LET CoCo WATCH YOUR HOUSE WHILE YOU ARE AWAY. LESS THEN TWENTY DOLLARS OF RADIO SHACK COMPONENTS. PLANS AND SOFTWARE. WRITE FOR DETAILS

(THIS AD TYPESET WITH THE COLOR GRAPHIC PRINTER)

TRANSTION TECHNOLOGY  
1458 W. BIRCHWOOD AVE.  
CHICAGO IL 60626

PLEASE SPECIFY  
SYSTEM  
10K-MIN

\*1.50 SHIPPING AND HANDLING C.O.D. EXTRA

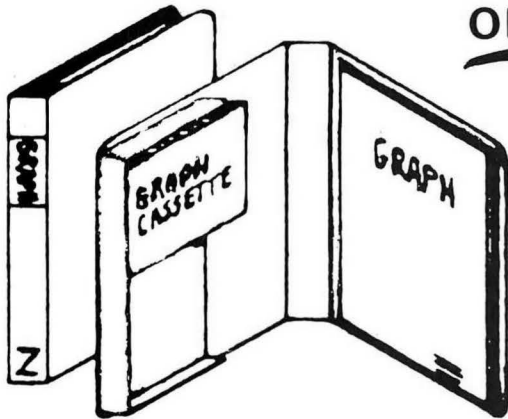
\*TANDY Corp





**ORGANIZE** and **PROTECT** your **VALUABLE** software library the **COLORFUL** way with **ZETAPAKS™** from **ZETA Computer**.

Mix 'n' match your collection with these rugged-vinyl software "safes" in a choice of **4 COLORS**. Now you can store your media **TOGETHER** with your instructions on the **SAME** shelf with your computer books.



ONLY      **\$3.50 EACH** or  
**\$38.95 Per DOZEN**  
Postpaid

—COLORS—  
**BEIGE**  
**TAN**  
**BLUE**  
**YELLOW**

### **HOLDS ALL TYPES OF SOFTWARE MEDIA**

Besides holding a 6" × 8½" manual up to ½" thick, a **ZETAPAK** can hold 2 audio/digital cassettes

- or 2 stringy floppy cartridges
- or 2 of the new 3" micro disks
- or 6 5¼" floppy disks
- or 2 ROM cartridges (up to ⅞" thick)

Ask you local computer dealer to stock **ZETAPAKS** or  
**ORDER DIRECT: ZETACOM Dept. RB**  
**P.O. BOX 3522**  
**GREENVILLE, SC 29608**

- \*Specify how many of what color.
- \*Send Bank or PO Money Order for fastest service.
- \*COD is fast but \$2 extra. \*Please allow 4 weeks delivery on checks.
- \*Foreign: US Funds add .50 each for Air Mail. \*Purchase Price of \$3.00 each **ZETAPAK** REFUNDABLE if returned unopened within 30 days. \***SOFTWARE PUBLISHERS/DEALERS** write or call for discount schedule...(803) 246-1741 after 1 P.M. EST.

```

2080 PLAY"V30;03;T255;L255"
2090 FOR JJ=1TO30
2100 PLAY"CDEABFCD;V-"
2110 NEXT
2120 PD$="FGRPBCZXAPLTYEIKBNTLD
FSEOKBVCXRUGJVJXOQ"
2125 CLS
2130 FOR JJ=1TO50
2140 LN=RND(5):LL=RND(35)
2150 ST$=MID$(PD$,LL,LN)
2160 PRINT@RND(510),ST$
2170 SOUND169,1
2180 NEXT
2190 RETURN
2200 RESTORE
2210 FORPQ=1TO26
2220 READWW$:NEXT
2230 DATA131,134,140,147,150
2240 DATA153,156,166,169,172
2250 DATA195,198,201,204,211
2260 DATA214,217,220,230,243
2270 DATA246,249,252
2280 FORWD=1TO RND(22)
2290 READDB
2300 NEXT
2310 RESTORE

```

```

2315 IF CG<>0 THEN GOTO3000
2320 'BUILD BORDER
2350 FORBD=1024TO1504 STEP32
2360 POKEBD,DB
2370 POKEBD-1,DB
2380 NEXT
2400 POKE1055+480,DB
2410 RETURN
3000 IF CG=1 THEN CG=0:GOTO765
3010 IF CG=2 THEN CG=0:GOTO 940
3020 IF CG=3 THEN CG=0:GOTO1110
3025 IF CG=4 THEN CG=0:GOTO1280
3030 IF CG=5 THEN CG=0:GOTO1450
3040 IF CG=6 THEN CG=0:GOTO1630
3050 IF CG=7 THEN CG=0:GOTO1790
3055 PRINT"ERROR.....":STOP
8000 POKE1024,DB:POKE1055,DB:RET
URN
8010 POKE1056,DB:POKE1087,DB:RET
URN
8020 POKE1088,DB:POKE1119,DB:RET
URN
8030 POKE1120,DB:POKE1151,DB:RET
URN
8040 POKE1152,DB:POKE1183,DB:RET
URN
8050 POKE1184,DB:POKE1215,DB:RET
URN
8060 POKE1216,DB:POKE1247,DB:RET
URN
8070 POKE1248,DB:POKE1279,DB:RET
URN
8080 POKE1280,DB:POKE1311,DB:RET
URN
8090 POKE1312,DB:POKE1343,DB:RET
URN
8100 POKE1344,DB:POKE1375,DB:RET
URN
8110 POKE1376,DB:POKE1407,DB:RET
URN
8120 POKE1408,DB:POKE1439,DB:RET
URN
8130 POKE1440,DB:POKE1471,DB:RET
URN
8140 POKE1472,DB:POKE1503,DB:RET
URN
8150 POKE1504,DB:POKE1535,DB:RET
URN
9000 GOTO20000
9045 IFNO$="Y" THEN 9095
9050 PLAY"V30;03;T255;L255"
9060 FORGL=1TO3
9070 PLAY"DEFGABC;V-"
9080 PLAY"CBAGFED;V+"
9090 NEXT
9095 NO$="":RETURN
10000 GOSUB20000
10500 IF HT$="Y" THEN RETURN
10600 POKE1058,ASC("P")
10700 POKE1059,ASC("R")

```

```

┌───┐
│ < MATHFACT > │
│ B5 SOFTWARE (C) 1982 │
├───┤
│ (A) ADDITION │
│ (B) SUBTRACTION │
│ (C) MULTIPLICATION │
│ (D) DIVISION │
│ SELECT LEVEL 1 OR 2? 1 │
│ SELECT A, B, C, OR D? A │
│ PLEASE TYPE YOUR FIRST NAME. │
│ BURTON │
└───┘

```

Requires 16K Extended Basic      Cassette      \$16.95

\*TRS-80 Color Computer/TDP-100      Ohio Residents  
\*Trademark of Tandy      Add 5% Sales Tax

**APPEALING GRAPHICS • FUN REWARDS • SOUND**  
Used Successfully In Classrooms and In Homes


**ALSO AVAILABLE-CASSETTES**

|                 |         |          |         |
|-----------------|---------|----------|---------|
| Clock           | \$24.95 | Carry    | \$19.95 |
| Money           | \$19.95 | ABC's    | \$ 9.95 |
| Subtract/Borrow | \$19.95 | Spelling | \$16.95 |
| Question        | \$19.95 | Hangword | \$14.95 |

WRITE FOR FREE DESCRIPTIVE BROCHURE  
OR ASK FOR DEALER DEMONSTRATION

**B5 SOFTWARE • DEPT. C**

1024 Bainbridge Pl. • Columbus, Ohio 43228 • (614) 276-2752







\*\*\* NEW \*\*\*

**DOLLARS AND SENSE** 16K Ext. \$11.95  
Learn to make purchases. Graphic displays of items kids love. Player buys using dollars and coins to practice using money correctly. Solutions given.

**MCCOCO'S MENU** 16K Ext. \$11.95  
America's favorite pastime — going out to eat! Learn to buy and add up your purchases from a typical fast food restaurant menu. Gain skill in using money. Different prices each time.

**MONEY-PAK** 32K Ext. \$22.95  
This is a menu-driven merged version of the above 2 programs. Also includes play money for extra reinforcement.

**ADDITION AND SUBTRACTION** 16K \$11.95  
Menu driven, 2 level program provides practice in adding or subtracting 2 digit numbers. Vertical format for proper entry of digits in the answers. Report card scoring.

\*\*\* NEW \*\*\*

**LONG DIVISION TUTOR** by Ed Guy  
16K Ext. Basic \$14.95  
A tutorial that takes the child through all steps of the example. Includes HELP tables, cursor aids, and graphic aids. Input your own numbers, or let the computer choose the example. Three levels of difficulty. Great teaching program!

**MULTIPLICATION TUTOR** by Ed Guy  
16K Ext. Basic \$14.95  
Similar type tutorial to the above. All carries indicated. Teaches examples from one to three place multipliers.

**READING AIDS 4-Pak** 16K Ext. \$19.95  
A 4 part menu driven program for the Elementary school child to create his own original reading material. Includes the 4 popular programs — POETRY, SILLY STORIES, SILLY SENTENCES and WIZARD, now expanded to 16K Extended Basic.

**Beyond Words** 32K Ext. \$19.95 Each  
3 Part menu driven program with tutorials and grade appropriate subtests and reviews. Over 400 questions, 800 words, modifiable.  
\* Beyond Words I - Grades 3-5  
\* Beyond Words II - Grades 6-8  
\* Beyond Words III - Grades 9-12

**VOCABULARY BUILDERS** 32K Ext. \$19.95 Each  
4 Part multiple choice format. 200 questions, 1000 words. User modifiable.  
\* Vocab. Builder I - Grades 3-5  
\* Vocab. Builder II - Grades 6-8  
\* Vocab. Builder III - Grades 9-12

On Disk  
Beyond Words I and Vocab. Builder I \$38.95  
Beyond Words II and Vocab. Builder II \$38.95  
Beyond Words III and Vocab. Builder III \$38.95

**FOREIGN LANGUAGE GAMES** 16K or 16K Ext. \$11.95

\*\*\*\*\* NO EXTRAS NEEDED \*\*\*\*\*  
Instructions are included enabling you to modify these programs for additional vocabulary or verb practice. Create your own future versions!!!

**FRENCH BASEBALL** — Score base hits or home runs for correct answers. You're out if wrong. Correct answers supplied. Fun way to learn and practice vocabulary. 2 levels. 200 questions  
**SPANISH BASEBALL** — Same game using Spanish vocabulary words.  
**ITALIAN BASEBALL** — Same game using Italian vocabulary words.

PLEASE SPECIFY LANGUAGE AND VERSION

**PRESCHOOL PACK 1** by Joseph Kolar  
16K Ext. \$11.95  
Clown and Fish-Num: Two programs to help your child recognize and count the words and numbers 1 - 10. Hi-res graphics and lively songs help to attract and keep attention.

**PRESCHOOL PACK 2** by Joseph Kolar  
16K Ext. \$11.95  
Count Kids and Add Penny: Two programs to help your child count and add up to 10. Beautiful hi-res graphics.

**PRESCHOOL PACK 3** by Joseph Kolar  
16K Ext. \$11.95  
Alpha-Byte: Programs designed to teach recognition and identification of the alphabet. Attractive hi-res graphics.

Each of the above Preschool Packs on disk - \$15.95  
All three Preschool Packs on disk - \$38.95

**HEBREW BULLETIN BOARD** 16K Ext. \$15.95  
by Joseph Kolar  
A utility that will enable YOU to create Hebrew or Hebrew/English words, flash cards, sentences, greeting cards, etc. in Hi-res. Easy to learn-full documentation. For hard copy, use your printer and any screen print program.

**MUSIC DRILL** by David Steele  
16K Extended \$19.95  
A high resolution program that teaches and tests the notes of the Treble and Bass clefs in each of the 10 most popular Major and Minor keys.  
"A must for all MUSIC students."

"2 FOR THE PRICE OF 1!"

**SPECIAL — CLOSEOUT** of Creative Computing's never released software for the CoCo. 2 Hi-Res machine language, joystick controlled arcade style games. PICNIC (escape spider, capture food), TRICKASHAY (tank duel in a tricky maze). 1 or 2 players, multi-level. 16K Ext. Both for an incredible \$11.95

**THE WIZARD NOW SPEAKS**

**THE TALKING WIZARD** 16K Ext. \$19.95  
A talking version of our popular WIZARD game. This is a child size (Eliza-Freud) lype game. Input any question and the WIZARD writes and now SPEAKS (through the T.V. speaker) an amusing answer. Great for reading practice or just plain fun.  
voice by-Classical Computing Inc.

**COCO-JOT** by Steve Greenberg  
16K \$11.95  
A new version of the famous Jotto word game. A guessing game using your powers of reasoning and deduction. 1 or 2 player game. Different levels of play. Ages 8 to adult. User modifiable.

**GHOST** 16K Ext.  
by Sherman Rosen \$11.95  
Color Computer version of the famous word game. 2 levels. Ages 8 to adult. Great Family Fun!

**SOFTWARE FOR SPECTRUM'S LIGHT PEN**  
KID'S FUN-PAK: This 3 program game set will entertain you with a great new dimension for your computer. Tutorial included with documentation.  
Kid's Fun-Pak Tape 16K Ext. \$14.95  
Light Pen and Tape \$34.95

**COMPUTER ISLAND**  
DEPT. R  
227 Hampton Green  
Staten Island, N.Y. 10312

(212) 948-2748

DEALERS INQUIRIES INVITED

FREE set of BINARY DICE, including full directions, with orders of 2 or more items.

Add \$1.00 S/H - N.Y. Add Proper Tax  
Send for catalog of other programs

16K **CIRCUS ADVENTURE** \$9.95  
A child's adventure game with many songs, graphics, and surprises. Meet all of your circus favorites while searching for the popcorn man. Great family fun for all ages.

16K **SCHOOLMAZE ADVENTURE** \$11.95  
While in search of a lost computer tape, you travel in a school and draw pictures, compose songs, play basketball, and use the keyboard to travel in the hallways.

Authors: We are seeking quality children's software for leisure or learning. Write for details. Top royalties.



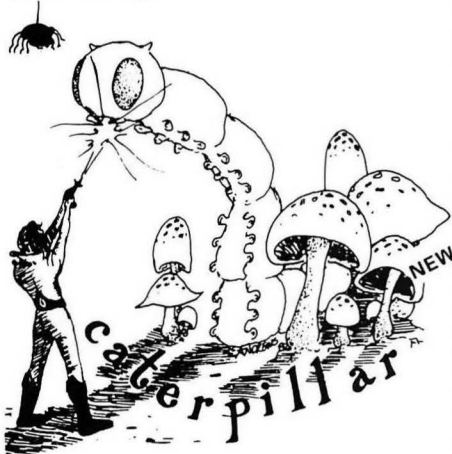




**QUEST — A NEW IDEA IN ADVENTURE GAMES!** Different from all the others. Quest is played on a computer generated map of Alesia. Your job is to gather men and supplies by combat, bargaining, exploration of ruins and temples and outright banditry. When your force is strong enough, you attack the Citadel of Moorlock in a life or death battle to the finish. Playable in 2 to 5 hours, this one is different every time. 16k TI99, TRS-80 Color, and Sinclair, 13K VIC-20. \$14.95 each.

32K TRS 80 COLOR Version \$24.95.

Adds a second level with dungeons and more Questing.



**CATERPILLAR**

O.K., the Caterpillar does look a lot like a Centipede. We have spiders, falling fleas, monsters traipsing across the screen, poison mushrooms, and a lot of other familiar stuff. COLOR 80 requires 16k and Joysticks. This is Edson's best game to date. \$19.95 for TRS 80 COLOR.



**ADVENTURES!!!**

The Adventures below are written in BASIC, are full featured, fast action, full plotted adventures that take 30-50 hours to play. (Adventures are interactive fantasies. It's like reading a book except that you are the main character as you give the computer, commands like "Look in the Coffin" and "Light the torch.")

Adventuring requires 16k on Sinclair, TRS-80, and TRS-80 Color. They require 8k on OSI and 13k on VIC-20. Sinclair requires extended BASIC. Now available for TI99. Any Commodore 64.

\$14.95 Tape — \$19.95 Disk.

**ESCAPE FROM MARS**

(by Rodger Olsen)

This ADVENTURE takes place on the RED PLANET. You'll have to explore a Martian city and deal with possibly hostile aliens to survive this one. A good first adventure.

**PYRAMID** (by Rodger Olsen)

This is our most challenging ADVENTURE. It is a treasure hunt in a pyramid full of problems. Exciting and tough!

**DERELICT**

(by Rodger Olsen & Bob Anderson)

New winner in the toughest adventure from Aardvark sweepstakes. This one takes place on an alien ship that has been deserted for a thousand years — and is still dangerous!

**Dungeons of Death** — Just for the 16k TRS-80 COLOR, this is the first D&D type game good enough to qualify at Aardvark. This is serious D&D that allows 1 to 6 players to go on a Dragon Hunting, Monster Killing, Dungeon Exploring Quest. Played on an on-screen map, you get a choice of race and character (Human, Dwarf, Soldier, Wizard, etc.), a chance to grow from game to game, and a 15 page manual. At the normal price for an Adventure (\$14.95 tape, \$19.95 disk), this is a giveaway.

**WIZARDS TOWER** — This is very similar to Quest (see above). We added wizards, magic, dragons, and dungeons to come up with a Quest with a D&D flavor. It requires 16k extended color BASIC. \$14.95 Tape, \$19.95 Disk. VIC 20 Commodore 64.



**NEW**

**PLANET RAIDERS** — Not just another defenders copy, this is an original program good in its own right. You pilot a one man ship across a planetary surface dogfighting with alien ships and blasting ground installations while you rescue stranded troopers. Rescue all the troopers and be transported to another harder, faster battle. Joysticks required. ALL MACHINE CODE! EDSONS BEST! 16K Tape TRS80COLOR \$19.95 — 32K Disk \$21.95.

**BASIC THAT ZOOMS!! AT LAST AN AFFORDABLE COMPILER!**

The compiler allows you to write your programs in easy BASIC and then automatically generates a machine code equivalent that runs 50 to 150 times faster.

It does have some limitations. It takes at least 8k of RAM to run the compiler and it does only support a subset of BASIC—about 20 commands including FOR, NEXT, END, GOSUB, GOTO, IF, THEN, RETURN, END, PRINT, STOP, USR (X), PEEK, POKE, \*, /, +, -, >, <, =, VARIABLE NAMES A-Z, SUBSCRIPTED VARIABLES, and INTEGER NUMBERS FORM 0-64K.

TINY COMPILER is written in BASIC. It generates native, relocatable 6502 or 6809 code. It comes with a 20-page manual and can be modified or augmented by the user. \$24.95 on tape or disk for OSI, TRS-80 Color, VIC 20, or Commodore 64.

**SEAWOLFE** — ALL MACHINE CODE In this high speed arcade game, you lay out patterns of torpedoes ahead of the attacking PT boats. Requires Joysticks, at least 13k RAM, and fast reflexes. Lots of Color and Sound. A fun game. Tape or Disk for Vic20, Commodore 64, and TRS-80 Color.

\$14.95 Tape - \$19.95 Disk.

**Dealers** — We have the best deal going for you. Good discounts, exchange programs, and factory support. Send for Dealer Information.

**Authors** — Aardvark pays the highest commissions in the industry and gives programs the widest possible advertising coverage. Send a Self Addressed Stamped Envelope for our Authors Information Package.

**Adventures and Quest now available for TI99**

*Please specify system on all orders*

**ALSO FROM AARDVARK** — This is only a partial list of what we carry. We have a lot of other games (particularly for the TRS-80 Color and OSI), business programs, blank tapes and disks and hardware. Send \$1.00 for our complete catalog.

**AARDVARK**

**2352 S. Commerce, Walled Lake, MI 48088 / (313) 669-3110**

**Phone Orders Accepted 8:00 a.m. to 4:00 p.m. EST. Mon.-Fri.**

**\$2.00 shipping on each order**





# Work Station On Wheels

By Richard Giovanoni

*This 1cc Gocart Brings Home Economy  
Of Organization Rather Than Mileage*

This past Christmas, when I added a printer to my TRS-80 Color Computer, it became obvious that I would have to consolidate my work area. Too many cables and cords, and space was becoming a problem. Two of my sons were home from college: it's amazing how they consume food and space in an exponential relationship to their presence. Necessity, then, was the mother of my prototype portable computer center, 1cc Gocart.

Now my total operation is contained within a four-square-foot area. It's on wheels and I can retreat to any leftover space in the house. The computer, printer, recorder, tapes, notebooks and magazines have all been stacked and shelved in a converted stereo cabinet. (The cheap kind that go for about \$20 on sale.) The overall

setup is shown on page 2 of the plans.

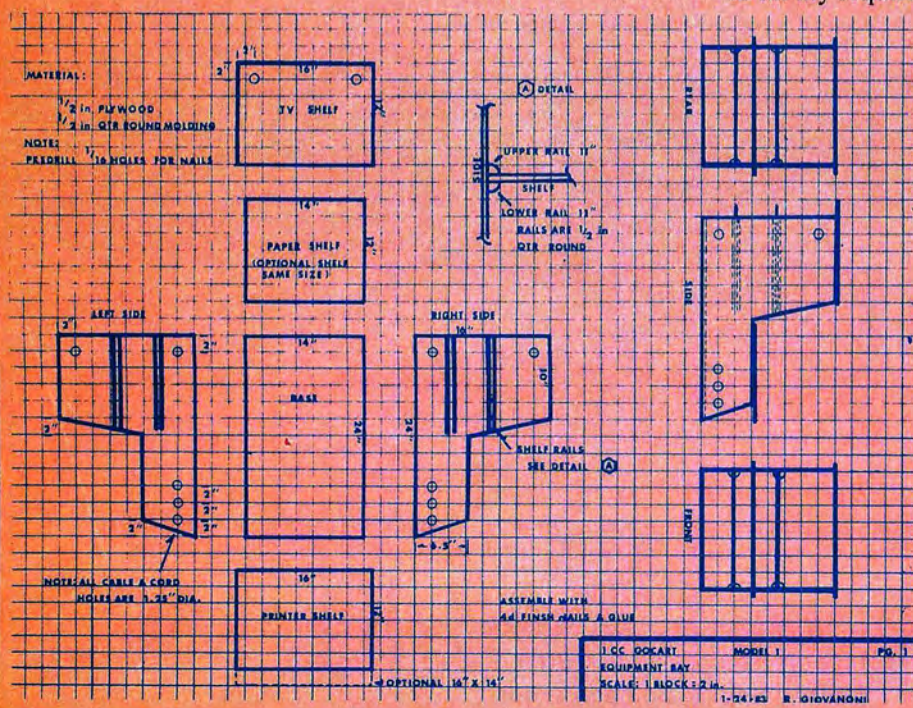
Since this was my prototype, a good deal of the construction was dictated by what odds and ends I had on hand. This included the stereo cabinet which no longer was in use. As it turned out, the system has worked so well that I haven't even taken the time to finish it up properly. The pristine beauty of its rough hewn plywood remains intact for all to admire.

## Construction

Building the Gocart was done in two stages, the base and the equipment-holding upper section.

It all started with the basic stereo cabinet; it set the size, and because it was available, meant the project could be completed sooner. Five major modifications were needed to fill my requirements.

- 1) Metal reinforcing angles were added to all four corners on the back of the cabinet to make the unit more solid.
- 2) I added the casters along the bottom, using eight of them mounted on pieces of scrap one inch board. I figured eight of them were needed to distribute the load and provide stability.
- 3) The second sliding shelf was installed four inches down from the top. In my case this is a piece of half inch plywood, 20 x 15 inches. Strips of half-inch quarter round molding make up the rails as shown in Detail A on page 1 of the plans.
- 4) A 1½ inch hole was cut in the middle of the back panel about two inches down from the top so the recorder cord and cable could be brought out to the power outlet and computer.





5) To provide support for the TV, an end support, 12 inches wide was added to the left side between the upper and lower shelves. By inserting the extra shelf as shown, I picked up a place for my notebooks and other miscellaneous stuff that I tend to accumulate.

Once this task was complete I could attach the construction of the equipment bay shown in the plans on page 1.

I figured out how to stack up the rest of the equipment so that I could get at, and see everything in the most efficient manner for me. I'm right handed, over six feet, and a lousy typist, all of which influenced my set up and some of the vertical dimensions.

Page 1 of the plans shows the layout of the pieces that make up the equipment bay. They were all cut out of half inch plywood. After the rails for the sliding shelves have been put on with glue and brads the sides can be assembled to the base. I used glue and four penny finish nails. By slipping in the shelves at this time the proper spacing can be maintained while the TV shelf is hammered home. At this point the unit is solid as a rock. The printer shelf is installed last. All those 1 1/4 inch holes are for getting the cables and cords routed to the proper place and still keeping them out of the way.

The completed bay was lined up on top of the base and clamped in place while I drilled 1/4 inch holes at each end down through the top shelf of the base. Quarter-inch bolts and wing nuts installed through these holes make everything secure and allow for easy removal.

The easel holds papers or magazines when typing programs. The location is a must for me. As a hunt and peck, two-fingered typist I have to have the copy as close to the keyboard as possible. That's one of the main reasons for my "in-line" arrangement of the equipment. This setup also makes it easier to check the text against the screen when trying to find typing bugs.

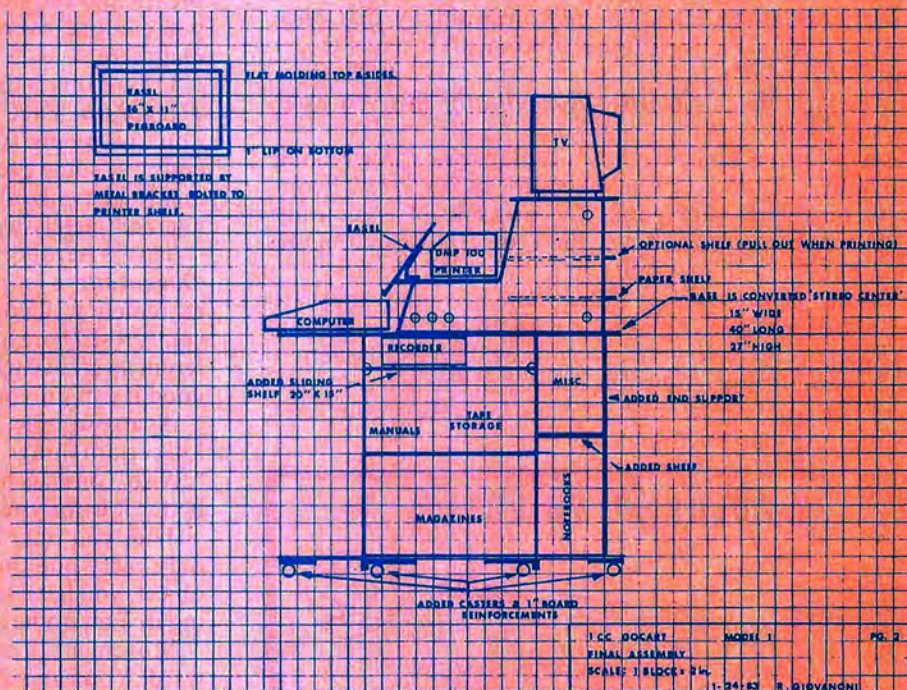


My daughter, Mary, at the controls. The overall arrangement is shown with the BW portable I use most of the time. The recorder shelf is in the stored position.

To attach the easel I used an old bracket that I found in my junk box. I bent it to about a 60 degree angle and then bolted it to the front edge of the printer shelf. The easel was then attached with another bolt to the other leg of the bracket. I found that it was best for me to adjust the location of the easel so that the lower edge just rests on the top of the computer case.

The easel is a piece of leftover pegboard. I glued half-inch flat molding strips along the top and sides. A piece of one inch inside corner molding serves as a lip that forms the paper rest.

A short extension cord with three outlets is attached to the back of the cabinet near the computer end. Printer, computer and recorder power cords, fed through those 1 1/4 inch holes along the sides, all plug in here. It is close to my left hand so that I can unplug the computer easily at the end of a session. The excess length of the cables and cords are coiled and secured with garbage bag ties and lie



out of the way on the base of the equipment bay under the printer and paper shelves.

As an example of routing, the cable from the RF modulator feeds down through the hold in the right side of the TV shelf, out the top hole in the right side, back in through the bottom hole and then to the computer port, with the excess coiled up. This path keeps it out of the way of the printer and the paper feed.

I added the optional storage shelf above the paper tray because the space was there to use. When the printer is in use I slide this shelf back out of the way.

If I had to do it over, I would make the printer shelf a couple inches deeper (as shown by the dotted lines on the plan) to give me a little more clearance for my DMP 100 printer. Obviously, this particular shelf has to be sized to whatever printer you may have. Next time I would use ball-type casters; it would be much easier when moving over carpeted areas. I am still trying to figure out how to add a built-in light.

I'm really happy with the setup and hope that it contains some ideas useful to others.



## Dungeons Of Daggorath New Adventure Standard

(Editor's Note: This review is made possible through an advance copy of the program provided to *the Rainbow* by Radio Shack.)

We seem to be breaking frontiers all over the place for CoCo these days. The arcade games get better and better yet; the utilities become more and more powerful; the abilities of our favorite computer seem to grow more and more each month in regard to data bases, word processing and the like.

Now, in the world of Adventure gaming, there is a new standard. It is called *Dungeons of Daggorath*. It is from Radio Shack, available in a Program Pak.

Frankly, it is one of a kind—yet I expect to see more of its ilk in the months ahead. The reason is simply that once someone does something, the way they do it tends to get around.

In the case of *Dungeons of Daggorath*, this is a clear bonus for us all.

As most everyone who reads this magazine for very long will know, I am hooked on Adventure games. Now, I confess to not being very good (the pressure of a monthly deadline seems to slow down the time I have to analyze them), but I love to play 'em.

Thus far, *Dungeons of Daggorath* is simply the best Adventure game I have played to date. In fact, it is almost a falsehood to say that it is an Adventure—because the action gets fast and furious, much like many of the better arcade games I've enjoyed. In short, it is more an Adventure/Arcade offering than anything else!

Thanks to an advance copy of both the documentation and the Program Pak, we can probably stay ahead of some of you until next month—that's when *Dungeons of Daggorath* goes on sale at your local Radio Shack stores and dealerships. But, while we are, so far, the number one player of this excellent offering, it is only fair that we tell you something about it (this is a review, isn't it?)

*Dungeons of Daggorath* is a three level, real time Adventure that makes you do a bit of thinking and a lot of fast reacting all at once. But, it also won't let you go too fast. Oh, I'm getting ahead of myself . . .

The screen is divided into three segments—one which shows the area you are in—in G 3D-type maze format, the second showing what you are holding (if anything) in each hand. At the bottom of all this is a four-line "command area" that lets you enter commands.

In the middle of the status area is a beating heart—yours. As you exert yourself, the heart beats faster and faster. If it gets going too fast, you're a goner—which means you can't rush through room after room. If you do, you'll be out of breath and the smallest, tiniest spider might do you in. Or, you can just overexert yourself and burst your heart then and there.

I think this is the most true to life aspect of *Dungeons of Daggorath*. Face facts: If you are a real adventurer, you don't go racing from room to room. And, you do have to conserve some energy. A lot of programs do this with water and food availability—but *Dungeons* handles it in real time and completely true to life.

This is hardly the only thing which makes *Dungeons of Daggorath* a superior program, however, the maze is extremely well constructed and populated with all sorts of creatures. There are also various kinds of objects—and different levels of each object. The stronger the object, the more good it can do you.

As an example, you start with a wooden sword, which can kill certain things. But there is also an iron sword . . . and an "elvish" one, as well. The more powerful the sword, the better it is for you!

Too, you only have two hands, and generally, you can only carry one thing at a time in each. To actually use an object, you have to specify the hand in which you are carrying it. You do have a pack, though, to stow other things.

Movement is easy, using just the "M" key to move forward. You can turn around, turn right or left and the like. You can also move backwards (backpedal), something that is often necessary in a fight to get your heart slowed down a bit.

Incidentally, the sound is fantastic. You can hear an opponent before you can see it (and each has its own distinct sound). Your heartbeat is audible, too. And, when you light a torch, you can hear the match sizzle.

Commands can be abbreviated (but must be separated by a space, which can be frustrating) and there is a save game feature (to cassette). The only thing we didn't like was that there is no "score" *per se*, you either live or die. We think the addition of some sort of status after death would be a nice addition to *Dungeons of Daggorath*.

This game is not for the novice adventurer, nor for the novice arcade player, either. But, with a little skill and thinking (fast thinking), *Dungeons of Daggorath* will provide you with more fun than you've had in quite a while.

*Dungeons of Daggorath*: A great game!

(At Radio Shack stores, dealers and computer centers, \$29.95)

—Lonnie Falk

### ★ COLONIAL TRILOGY ★



THREE INCREDIBLE NEW GAMES  
FOR THE COLOR COMPUTER

HI-RES — 32K — EXT BASIC

**COLONIAL WARS:** TWO PLAYER GAME ON A GALACTIC SCALE WITH HYCOMP'S UNIQUE SPLIT SCREEN CONCEPT—IT'S ALMOST LIKE HAVING A SEPARATE MONITOR FOR EACH PLAYER! COLONIZE AND BATTLE FOR CONTROL OF AN 11 STAR SYSTEM WHILE COMMANDING MASSIVE BATTLECARRIERS, FIGHTER SQUADRONS, FREIGHTERS, AND PLANETARY DEFENSE. WITH GAME SAVE (3-8hrs)

**ZYRON:** TWO PLAYERS BATTLE WITHIN AN ASTEROID FIELD WITH SHIPS BUILT TO THEIR OWN SPECIFICATIONS. TWO SCENARIOS INCLUDED—ONE PLAYER TRIES TO SLIP FREIGHTERS PAST THE OTHER'S DEFENSES OR AN ALL OUT BATTLE. (2-4hrs)

**QUESTAR:** EXPLORE OVER 30 PLANETS AND ENCOUNTER UNKNOWN CIVILIZATIONS, DESERTED CITIES, AND BUSY STARPORTS WHILE SEARCHING FOR HIDDEN ZYRON BASES. AN EXCELLENT ONE PLAYER GRAPHICS ADVENTURE GAME. (60-90min)

ONLY \$19.95 EACH OR ALL THREE FOR \$49.95!

PLUS \$1.50 FOR SHIPPING

CHECK OR MONEY  
ORDER ONLY.  
SEND SASE FOR  
MORE INFORMATION.

AVAILABLE ONLY FROM

\*HYCOMP\*

P.O. BOX 15331  
TULSA, OK 74158  
(918)266-6452



## *Fastape: ML Utility* Allows High Speed I/O

Much has been said lately about the high-speed, or vitamin E *POKE* for our CoCo. While in this mode, BASIC programs will run about 30 percent faster, making number crunching and arcade-type programs execute at a more satisfactory speed. The major problem in using high-speed is that you cannot do any I/O operations to your cassette, printer, or disk. If you do, you will find out the true meaning of "I/O error" or possibly a "locked up" system. What we need is a way to have our cake and eat it too.

*Fastape* is a machine language utility that will solve most of these problems. With it, you can save and load programs and data from cassette, and use your printer, all while remaining in high-speed mode. Once loaded, the program will auto-execute and automatically adjust itself for the amount of memory you have. Unlike most machine language utilities, it is not necessary to reserve space for it, by means of a *CLEAR* statement, before loading it in.

Using *Fastape* could not be easier. It operates in four modes. The first two are the high and low (or normal) speed CPU modes. These modes will have your CoCo running in either the high or low speed mode of operation, just as if you had entered the proper *POKEs*. Each of these modes, in turn, have two speed modes for cassette operations. The high speed cassette mode will save and load your files in almost exactly one-half the normal time. Unbelievable, but true! The low speed mode (did you guess it already?) operates just as if the program was not running.

With the combination of these four modes, you can save or load data in any desired format. This allows for the necessary flexibility when you first start to use the program, by enabling you to load your existing tapes, and then to save them out in the high-speed format. You can even load tapes created in the high-speed CPU mode that were saved without using the program (possibly by accident).

When using your printer with *Fastape*, it will automatically adjust the baud rate for you, so that your printer will produce the listings you want, instead of garbage. If you operate your printer at a rate other than the default of 600 baud, all you have to do is to enter the necessary *POKE* prior to loading the program, or while it is running in the low-speed CPU mode.

Switching between operating modes is accomplished by holding down the "control" (down arrow) key and pressing the number 1 to 4 key, depending on which of the modes you want. The control key can also be used to speed up the entry of some common BASIC commands. These include the audio, motor, and cassette commands, as well as a few others. In addition, you can use it to find out which of the modes you are in, in case you have forgotten.

*Fastape* is a great utility program that should prove to be boon to all cassette users. The documentation explains everything you need to know in order to use it without any problems, and it works like a champ. If you are tired of waiting for those tapes to load, I strongly recommend that you buy this fine utility. If I could only figure out how it works.

(SpectroSystems, 1111 North Kendall Drive, Suite A108,  
Miami, FL 33176, \$21.95 tape)

—Gerry Schechter

## Federal Hill Software

### Coco-Accountant!

Were your taxes a mess this year? Make those deductions a breeze! Use data from up to 450 canceled checks for reports of expenditures by month, account of payee! Flags deductible checks, checks subject to sales tax—even computes the sales tax you paid. Lists to screen or printer. \$15.95 on tape, \$21.95 on disk. **32K**

**CREDIT ACCOUNTANT** performs same functions for credit card expenditures. Only \$9.95 when ordered with Coco-Accountant (tape or disk).

### Blackjaq!

As close as you can come to the real thing without losing your shirt. Full casino simulation -- up to 5 players and 9 decks. Computer plays vacant hands by card counting rules, gives counting pointers, keeps track of winnings and will even print out results of every hand! Keyboard or joystick. Nothing else like it in 16K Ext. \$19.95 on tape, \$24.95 on disk.

### The Handicapper!

Use the power of your COCo to improve your performance at the track! Separate 16K programs for thoroughbred and harness horses apply proven handicapping techniques using speed, pace, post position, past performance, driver or jockey record and horse's attributes. Simple enough for the beginner -- sophisticated enough for the veteran horseplayer. Detailed instructions. **Does not require Extended Basic.** Harness Handicapper or Thoroughbred Handicapper, \$24.95 on tape. Both programs, \$39.95.

### Printer Artist!

Turn your printer into an artist with this unique series of 16K Ext. programs. Create drawings of birds and animals, sports figures, ships, holiday and patriotic scenes, famous Americans and others. Set up a file of printer art on disk or tape. Includes 12 ready-to-run pictures and simple instructions for 40 more. Complete documentation and guide to creating your own art. \$19.95 on tape.

### Koko Math!

Teachers and parents: Are your kids bored with dull educational programs? Let Koko the Math Clown make arithmetic a joy! Get 10 problems right and give him a bath! All operations, three levels of difficulty. Colorful graphics and music. **Does not require Extended Basic.** \$8.95 on tape.

Federal Hill Software  
825 William Street  
Baltimore, Maryland 21230

# SAVE!!!

AT ARIZONA DISCOUNT SOFTWARE YOU CAN SAVE ON ALL SORTS OF SOFTWARE AND HARDWARE ITEMS FOR YOUR COLOR COMPUTER OR TDP 100!! (TDP IS A TRADEMARK OF TANDY)

## CHECK THESE OUT!!!

### GAMES 15% OFF!!!!

|                               | TAPE     | DISK     |
|-------------------------------|----------|----------|
| ZAXXON (DATASOFT)             | \$33.95* | N/A      |
| ZAKSUND (ELITE)               | 21.20*   | \$23.75* |
| THE KING (MIX)                | 24.60*   | 25.45*   |
| SHARK TREASURE (COMPUTERWARE) | 18.65    | 22.90    |
| SPACE SHUTTLE (MIX)           | 24.60*   |          |
| THE FROG (MIX)                | 23.75    | 26.30    |
| TRAPFALL (MIX)                | 23.75    | 26.30    |

### \*32K PROGRAM

### PLUS!!!

ALL OTHER TOM MIX, COMPUTERWARE AND PETROCCI PROGRAMS 15% OFF!!!!

ALL PRICKLY PEAR PROGRAMS 20% OFF!!!!

ALL MARK DATA PROGRAMS 20% OFF!!!!

(NOTE: LIMITED QUANTITIES ON SOME ITEMS)

### UTILITIES AND BUSINESS APPLICATIONS 15% OFF!!!!

## THE NELSON SUPER COLOR LIBRARY

|                                                               | TAPE    | RMPK    | DISK    |
|---------------------------------------------------------------|---------|---------|---------|
| SUPER COLOR WRITER 3.0                                        | \$59.45 | \$76.45 | \$84.95 |
| SUPER COLOR MAILER                                            | 33.95   | N/A     | 50.95   |
| SUPER COLOR CALC                                              | N/A     | 76.45   | 84.95   |
| SUPER COLOR DISK-ZAP                                          | N/A     | N/A     | 42.45   |
| SUPER COLOR TERMINAL                                          | 42.50   | 50.95   | 59.45   |
| SUPER COLOR SPELLER                                           | N/A     | N/A     | 59.45   |
| SUPER COLOR DATABASE                                          | N/A     | N/A     | 67.95   |
| THE ENTIRE SUPER COLOR LIBRARY (DISK ONLY) SAVE 20% OVER LIST |         |         | 423.75  |

|                                    | TAPE    | DISK    |
|------------------------------------|---------|---------|
| TELEWRITER 64 (COGNITEC)           | \$42.45 | \$50.95 |
| TOOLKIT (ARZIN)                    | 25.45   |         |
| DISK MANAGER (PRICKLY PEAR)        | N/A     | 25.45   |
| DISK MASTER (PRICKLY PEAR)         | N/A     | 21.20   |
| 64K SCREEN EXPANDER (COMPUTERWARE) | 21.20   | N/A     |

### FRANK HOGG LABS 10% OFF

|                    |        |
|--------------------|--------|
| FLEX               | 89.00  |
| FLEX & D/BASIC PKG | 117.00 |
| D/BASIC            | 36.00  |

### HARDWARE VALUES!!!!

LIKE OUR SOFTWARE VALUES, ARIZONA DISCOUNT SOFTWARE ALWAYS DISCOUNTS HARDWARE. LOOK AT THESE BARGAINS!!!!

|                    |        |
|--------------------|--------|
| 64K RAM CHIP SET   | 49.95  |
| R/S DISK INTERFACE | 149.95 |

|                                                                           |        |
|---------------------------------------------------------------------------|--------|
| DRIVE O FOR THE COCO (Tandon Drive and R/S Interface—Save \$175 over R/S) | 424.95 |
|---------------------------------------------------------------------------|--------|

|                                    |       |
|------------------------------------|-------|
| MARK DATA PROFESSIONAL KEYBOARD    | 59.95 |
| "F" BOARD AND TDP VERSION          | 64.95 |
| LCA 47 LOWER CASE ADAPTER          | 59.95 |
| COCO SWITCH (RS-232 SWITCH -3 WAY) | 29.95 |

### DRIVE CABLES

|                   | ONE DRIVE | TWO DRIVES | FOUR DRIVES |
|-------------------|-----------|------------|-------------|
| Gold Contacts     | 24.95     | 34.95      | 44.95       |
| Standard Contacts | 19.95     | 24.95      | 34.95       |

## IF YOU DON'T SEE IT—CALL!

CALL ABOUT CUSTOM MODS/CALL OUR 24 HR BBS (602) 245-0488

### TO ORDER

ADD \$2.00 POSTAGE AND HANDLING, \$1.50 C.O.D.

ARIZONA RESIDENTS ADD 6% SALES TAX

MAX. C.O.D. ORDER \$50.00

Send Check or Money Order To:

## ARIZONA DISCOUNT SOFTWARE

1110 S. ALMA SCHOOL SUITE 5-159  
MESA, AZ 85202

PHONE (602) 231-0080 (11 am-12m EDT)  
COMPUERVE I.D. # 71715,2001

## Morocco Gran Prix Roars With Action

In *Morocco Gran Prix*, Computerware's newest graphics game for the Color Computer, you are a pit crew member at the local race track. During qualifications, the world famous race driver Juan "el Racero" Gomez becomes sick on gasoline vapors. You decide to take advantage of the opportunity to take the high powered racer for a test drive, but little did you know that the race would begin as soon as you hit the track.

Once the game has loaded, you see the instruction screen. The racer is controlled with the right joystick. Left to right controls your steering, while forward and back controls your speed.

An overhead view of the brightly colored racer appears at the pits on the side. To begin the game just cross over the guard rail. A timer is instantly activated and the race is on! The timer begins counting down at 100 seconds. Points are awarded for the amount of time you stay on the track. The faster you drive, the more points you accumulate. If you crash, you end up at the pits on the side. To re-enter the track, just cross over the guard rail. Occasionally, you encounter night driving conditions and snow covered roads, just to keep you from getting bored. There are also a few surprises, such as fire trucks and the like. If you get over 2000 points by the time the timer runs out, you are awarded with an extended play. *Morocco Gran Prix* keeps track of the top ten scores.

The wisest strategy when racing is to start off fast. Once you pass by a car, don't worry about it anymore—it's out of the picture. All danger lies ahead. Develop a sense of timing early in the game as to how frequently other autos show up. At those times, slow down and survey the scene. If the racers ahead can be easily passed, then resume top speed. Of course, the best strategy is practice. And that's what you'll want to do, because *Morocco Gran Prix* is addicting!

Not only is the action portion of *Morocco Gran Prix* spectacular, but the game is a visual triumph as well. The racers themselves are handsomely detailed with color rivaling most coin-op video games. The only things missing are curves and road signs. The track remains straight throughout the entire game, and there are no road signs to add to the visual effects of the game. A red caution flag does appear once in a great while just before the fire truck hits the track. The sound effects are about average for the Color Computer, and are nothing short of spectacular when you crash (though it would be nice if the fire truck had a siren!).

*Morocco Gran Prix* is delightful to look at and a blast to play. Computerware should be congratulated for their work in this new racing game for the Color Computer.

(Computerware, Box 668, Encinitas, CA 92024, 32K Maching Language, \$24.95)

—Barry Younce



## Fast Action And Great Graphics Make *Planet Invasion* Challenging

As I loaded this 16K machine language program from Spectral Associates into my CoCo, I sighed at the prospect of what I thought would be just another space arcade game, but I soon discovered that the outstanding graphics and animation put this game in a class by itself.

*Planet Invasion* is a "Defender -type" arcade game. You are required to cruise above the planet's surface locating and destroying wave after wave of Praetorian invaders. The playing area extends off the screen in both directions, but author Steve Geiseking had the foresight to provide our ship with a long range scanner which helps determining the exact locations of the invaders. You are given a certain amount of time to destroy each wave or the invaders will begin to fire chasers at you, and these are extremely difficult to avoid. Developing an ability to use the long range scanner is important because it will save you a lot of time and will help to destroy a wave quickly before any of the deadly chasers appear.

In addition to the chasers, each wave is made up of different types of enemy craft, each with different characteristics. Grabbers will fire at you while they lower themselves to the planet's surface in order to grab the caloxin crystals which dot the terrain. After grabbing a caloxin crystal, they lift off and begin moving toward the top of the screen. There are two reasons why it is important to destroy the grabbers before they ascend to the top of the screen. First, if a grabber succeeds in reaching the top with a caloxin crystal it becomes a killer—a deadly, intelligent craft which seeks you out and spews rapid fire. Second, if the enemy succeeds in capturing or destroying all your caloxin crystals, you will be forced to fight "in the outer reaches of space far from the planet's surface." What this means is that the display of the planet's terrain disappears and only your ship and those of the enemy are displayed. Before this happened to me the first time I didn't think that it would make much difference, but, boy, does it! Without the surface of the planet scrolling by beneath you all sense of speed is lost and tracking and destroying the enemy becomes doubly difficult.

You can avoid this calamity by preserving your caloxin crystals. There are three ways to do this. First, of course, you can destroy the grabbers before they seize any crystals. This is an okay strategy for about the first two waves; after that, there are just too many of them for this to be effective. Second, you can destroy a grabber after it has seized a crystal and begun its ascent. If the grabber is destroyed at a low altitude, the caloxin crystal will drop back to the planet's surface unharmed. Finally, if you are forced to destroy a grabber with a crystal at a high altitude you can catch the caloxin crystal in mid-air and return it safely to the planet's surface; otherwise the crystal will be destroyed when it hits the surface.

In addition to the pesky grabbers and chasers, the Praetorians have an array of sophisticated weaponry pitted against you. Among these are miners which move slowly about the screen leaving mines which will destroy you if you collide with them. The only good thing about miners is that they are relatively easy to shoot down because they move so slowly. Beamers are deceptive; they sit there barely moving and are

very easy to hit, but when hit, they split into three berserkers and, boy, is that an appropriate name! These little attackers are difficult to shoot down because of their small size and their violently evasive maneuvers. They are intelligent trackers and literally spew out lethal rapid fire.

Fortunately our ship is equipped with three "smart bombs" which, when released, destroy all enemy ships presently on the screen. However, there are so few of them that one must be very judicious in their use. Fire them only when the screen is crammed with Praetorians or when you are threatened by a chaser.

Your ship is controlled by a combination of joystick and keyboard inputs. The right joystick controls elevation, direction and speed. If the joystick is positioned to the left, our craft moves to the left (that is, the screen scrolls to the right) and the further left the joystick is moved the faster the ship moves. I like this combination of speed and direction in one control. The fire button controls the laser fire and if you hold the button down you get continuous rapid fire, a feature I like very much. It really saves wear and tear on the old trigger finger. There is a tendency to fly along with the laser firing at all times but this doesn't really give you much of an advantage. Pressing the space bar fires one of the smart bombs, and pressing the "H" key moves your ship into hyperspace; that is, it moves you immediately to some other portion of the battle area. This can be very helpful when you find yourself in an area teeming with Praetorians and you want to get out fast.

On-screen scoring is provided and also high score for the session is displayed. You are also kept informed as to the number of ships remaining, the number of smart bombs remaining and the current Praetorian wave number. Documentation is adequate.

If you enjoy good space games then this one is for you. Another plus: Spectral Associates says it will replace the tape for only \$1.50 should it be accidentally erased or become unusable for any other reason. (How can you go wrong with a deal like that?) For disk users, instructions are provided for transferring the program to disk.

(Spectral Associates, 141 Harvard Avenue, Tacoma, WA 98455, \$21.95)

—David Johnson

K-2 READING PHONICS

### OLD McDONALD'S FARM VOWELS

A game like drill program to present long and short vowels with words, pictures and spoken messages. Teacher generated for home and school. Five challenging levels with scoring, rewards and reinforcement.

For COCO Color Computers with 16K Ext. Color BASIC & cass. OMF \$14.95 + 2.00 shipping VISA & M.C.



TEKSYM CORPORATION  
14504 County Road 15  
Minneapolis, MN 55441

# RECEIVED & CERTIFIED

The following products have been recently received by *the Rainbow*, examined by our magazine staff and approved for the *Rainbow Seal of Certification*, your assurance that we have seen the product and have ascertained that it is what it purports to be.

This month the *Seal of Certification* has been issued to:

**Scramble**, a 16K word game for two to four players. Objective: opponents alternate entering a 4-15 letter word, the computer scrambles the word, and your opponent must unscramble the word in 2½ minutes. Four skill levels. Kaleidoscopic Creations, P.O. Box 1284, Melrose Park, IL 60160, tape \$15.95.

**The Computer Camp Book**, a (8½" x 11", 227-page, soft-cover) book on computer camps and how to become a computer literate. First, it is a manual on how to start your own computer camp; second, it is a guide to computer camps, and third, it tells you how to become a computer literate. YSCC, 8327 Sheridan Lane, Eden Prairie, MN, \$12.95.

**TNT-ALYZ**, an electronic circuit analysis program of interest to electronic hobbyists, hams, and engineers. This program is capable of computing the gain and phase response of complex electronic circuits. Includes a 30-page manual. TNT Software, Route 2, Box 76 D, Manor, TX 78653, tape \$29.95.

**Fastape**, a 32K program which doubles the speed of your cassette operations and allows you full use of your cassette and printer, while the computer is running at high speed mode. Spectro Systems, 11111 N. Kendall Drive, Suite A-108, Miami, FL 33176, tape \$21.95.

**Function Graphing Module**, a 16K program that allows you to graph functions of a single variable on the high resolution graphics screen of your computer. Includes a 53-page manual. Calcsoft, P.O. Box 401, St. Ann, MO 63074, tape \$19.95.

**Amortise**, a 16K program which allows you to print amortization charts. Showing for each month, the date due, amount to principal, amount to interest, total interest to date, balance still owing and totals for each year. Dataman, Box 431, Station B, Hamilton, Ontario, Canada L8L 7W2, tape \$9.95.

**CoCo Copy**, a 16K machine language program that will copy BASIC or machine language programs including most automatic start programs. Dataman, Box 431, Station B, Hamilton, Ontario, Canada L8L 7W2, tape \$12.95.

**Pretty Printer**, a 16K machine language utility program that will allow you to write your code in a compact form and list to the screen or printer in an easy to read format. Dataman, Box 431, Station B, Hamilton, Ontario, Canada L8L 7W2, tape \$12.95.

**P.U.F.F.**, Printer Utility File Formatter, a 16K program which turns any word proces-

sor into a super printer formatter. Dataman, Box 431, Station B, Hamilton, Ontario, Canada, L8L 7W2, tape \$24.95.

**Fraction Math Quiz**, a 16K drill program with five skill levels from introductory elementary school to advanced high school fractions. Includes seven fraction operations and multiple choice format. Creative Technical Consultants, P.O. Box 652, Cedar Crest, NM 87008, tape \$14.95.

**Fire Copter**, a 32K full color graphics game for one to two players. Objective: you are aboard the *Fire Copter*, trying to keep your city from being burned to the ground by the minions of Pyro Maniac—the firedroids, while putting out the fires and destroying the firedroids. Adventure International, P.O. Box 3435, Longwood, FL 32750, tape \$24.95.

**Sea Dragon**, a 32K arcade game with seven skill levels for one or two players. Objective: you are sea captain of the nuclear sub—the *Sea Dragon*; make it through the mine field to reach your target—the Master mine—as you snake through treacherous underwater passages, avoiding mines, depth charges, stalactites, and enemy attack stations along your way. Adventure International, P.O. Box 3435, Longwood, FL 32750, tape \$34.95.

**Grafplot**, a 16K graph drawing program used to turn your computer into a data plotter producing graphs of any type of X-Y data. Hawkes Research Services, 1442 Sixth Street, Berkeley, CA 94710, Tape \$35, 32K disk \$45.

**An Adventure in Murder**, a mystery game. Objective: you are a detective hired to find the murderer of Mrs. McDermitt. While searching through her four-floor mansion you are given clues and a list of suspects enabling you to determine the murderer. Mr. R's Software, 68 Kelly Road, South Windsor, CT 06074, tape \$14.95.

**Zarconian Marble**, a 16K checker-style strategy game for one or two players. Objective: play against the computer or an opponent and be the first to either get five marbles in a row or first to make five captures. CoCo Hut, P.O. Box 24451, Houston, TX 77015, tape \$19.95.

**8-Ball**, (Rom Pac) a 16K arcade-type pool game for two players. Objective: try and be first to sink all of your balls and then the 8-ball to win the game. Anteco Software, P.O. Box 14728, 4220 Clay Avenue, Fort Worth, TX 67117, \$29.95.

**Family**, a 32K genealogical data base program for up to eight generations and 255 ancestors. Prints pedigree charts, family groups and a reference index. Available from The Word Merchant, P.O. Box 232, Lititz, PA 17543, tape \$9.95.

**Pie Chart**, a 16K graphing program which allows you to enter data such as monthly bills, yearly expenditures, etc. Harmonycs, P.O. Box 1573, Salt Lake City, UT 84110, tape \$10.95.

**Help! Color Computer Reference System**, a (4" x 6", 99-page, ringbound, soft-cover) reference system designed to provide the beginning programmer with the essential information needed to write personal and workable programs. Wright Books, 54 Vly Road, Albany, NY 12205, \$9.95.

**Rainbow-Writer**, a 16K high resolution graphics text display utility which allows you to write text on any graphics screen in rainbow colors. Rainbow Connection Software, 3514 6th Place, NW, Rochester, MN 55901, disk \$32.95.

**Electronic Calligrapher**, a 16K disk based calligraphing program that when used with a printer capable of dot matrix graphics will print any line, up to 25 characters, in either an Old English or Chancery cursive-type font. DSL Computer Products, Inc. 13726 West Warren, Dearborn, MI 48126, disk \$18.95.

**Pie Zapper**, a high resolution graphics program that produces pie charts on the screen. Includes a 26-page manual. Southern Software Systems, 485 Tropical Trail, Suite 109, Merritt Island, FL 32952, tape \$15.95, disk \$19.95.

**Convert**, a 16K program that will convert units of length, volume, area or weight from, or to, the equivalent imperial, metric, nautical or historical systems of measurement. Dataman, Box 431, Station B, Hamilton, Ontario, Canada L8L 7W2, tape \$9.95.

**Filmastr**, a general purpose database manager in data entry screen format which holds up to 20 data fields. The Computer House, Box 1051, DuBois, PA 15801, tape \$29.95, disk \$34.95.

**Time & Money**, a financial planning aid that will determine the value of investments and compare various methods of handling investments. The Computer House, Box 1051, DuBois, PA 15801, tape \$19.95, disk \$24.95.

**Master Control II**, a 16K machine language program designed to increase the speed it takes to write BASIC programs. Includes a



plastic keyboard overlay. Soft Sector Marketing, Inc., 6250 Middlebelt, Garden City, MI 48135, tape \$19.95. SSM is offering owners of the original Master Control an update to the newer version for \$8 plus \$2 S & H.

**Color Graphics Editor (CGE)**, a 16K machine language program that allows you to create on screen high resolution graphics which can also be transferred to disk. Soft Sector Marketing, Inc., 6250 Middlebelt, Garden City, MI 48135, tape \$19.95.

**Color Caterpillar**, a 16K machine language arcade-style game for one or two players. Objective: destroy the caterpillar in segments by firing missiles and gaining points by killing off mushrooms, tarantulas, and beetles. Soft Sector Marketing, Inc., 6250 Middlebelt, Garden City, MI 48135, tape \$19.95.

**Colonial Trilogy**, a series of three new 32K games with high resolution graphics. Volume I, **Colonial Wars**, a two-player space battle game with a split screen concept. Objective: colonize and battle for control of an eleven-star system while commanding massive battle carriers, fighter squadrons, freighters and planetary defenses. Volume II, **Zyron**, a space battle game for two players. Objective: battle within an asteroid field while one player tries to slip freighters past the others' defenses. Volume III, **Questar**, an adventure game for one player. Objective: explore over 30 planets and encounter unknown civilizations, deserted cities, and busy starports while searching for hidden Zyron bases. HYCOMP, P.O. Box 15331, Tulsa, OK 74158, \$19.95 each or all three tapes for \$49.95.

**BLACKJACK!**, a 16K casino simulation card game of "21" for one to five players. Objective: beat the dealer's hand without going over 21 points. Federal Hill Software, 825 William Street, Baltimore, MD 21230, tape \$19.95.

**Harness Handicapper**, a 16K program that applies established handicapping techniques and the power of the computer to the ratings of harness horses, which will enable you to improve your betting performances at the race track. Federal Hill Software, 825 William Street, Baltimore, MD 21230, tape \$24.95.

**CoCo Accountant**, a 32K home or small business accounting program that allows you to keep records of yearly expenses while providing information at tax time without the task of sorting through cancelled checks. Federal Hill Software, 825 William Street, Baltimore, MD 21230, tape \$15.95, disk \$21.95.

**Printer Artist**, a 16K four-program cassette and tutorial package on computer art. In-

cludes two programs containing 12 ready to run pictures and an instruction booklet for 49 other drawings which can be created, printed and saved to tape or disk using the two utility programs which will enable you to use those instructions to create pictures. Federal Hill Software, 825 William Street, Baltimore, MD 21230, disk \$19.95.

**Pick Which**, a 16K machine language game for all ages. Objective: search the screen in an effort to choose the most desirable picture. Detailed pictures fill the screen along with sounds. Spectral Associates, 141 Harvard Avenue, Tacoma, WA 98466, tape \$9.95.

**Space Race**, a 16K RAM machine language game with high resolution graphics and sound. Objective: maneuver your ship around the four-cornered race track while destroying alien ships and watching out for mines laid by the swarms. Spectral Associates, 141 Harvard Avenue, Tacoma, WA 98466, tape \$21.95.

**C-Trek**, a 16K space combat game. Objective: you are the captain of the ship and it is your task to destroy all the invading forces before they can launch their attack on the Federal seats of power. Spectral Associates, 141 Harvard Avenue, Tacoma, WA 98466, tape \$8.95.

**Color Zap**, a 16K high resolution graphics arcade game with 15 skill levels and sound. Objective: zap the onslaught of alien attacking ships as they seek to destroy you to gain entrance to the Stargate—which you are defending. Spectral Associates, 141 Harvard Avenue, Tacoma, WA 98466, tape \$9.95.

**Home Money Manager**, a disk-based personal checkbook system. It tracks data by date, paid to, check number, account number, amount of check, and current balance. Each of the printed reports will show monthly deposit total, expense total, gain or loss, and current balance. Computerware, Box 668, Encinitas, CA 92024, disk \$19.95.

**Introduction to Data Communications**, a five part, 16K program requiring Extended BASIC, designed to teach beginners the basic ideas and terminology to use a data communications device. Computerware, Box 668, Encinitas, CA 92024, tape \$17.95.

**Moon Hooper**, a 32K arcade game with five skill levels. Objective: you are out on test maneuvers in the new exploration machine, the *Moon Hooper* and must avoid being blasted by enemy saucers while firing phasers and racing toward your home base. Computerware, Box 668, Encinitas, CA 92024, tape \$24.95.

**Morocco Gran Prix**, a 32K race car game. Objective: you are part of the pit crew and in Juan "el Racero" Gomez's absence, you sneakily take his high-powered racer out

for a test drive and are caught in the middle of the actual race. See how well you can do, avoiding crashes and demolitions. Computerware, Box 668, Encinitas, CA 92024, tape \$21.95.

**Indexer**, a 16K machine language utility program which produces a sorted list of variables and line numbers used in your BASIC program. ML-US'R Software, 115 Rising Sun, Fort Mitchell, KY 41017, tape \$14.95.

**Label III**, a 16K mail list program which will print lists or labels of three or four line addresses and a telephone number. Owls Nest Software, P.O. Box 579, Ooltewah, TN 37363, tape \$19.95.

**Clock**, a 16K machine language time clock program that uses the interrupt that is generated by the VDG. Chroma-Systems Group, P.O. Box 366, Dayton, OH 45420, tape \$9.95.

**CCADS, Color Computer Assembly Language Debugging System**, a 16K complete language software development monitor. Included are a 6809 line assembler and disassembler, hex and ASCII memory dump, memory alteration routines, serial printer capabilities, and a user software execution controller with six breakpoints, and user register storage and modification. Chroma-Systems Group, P.O. Box 366, Dayton, OH 45420, tape \$19.95.

**Unlock**, a menu driven disk backup utility which produces copies of diskettes that cannot be backed up using the BACK UP command from BASIC. Chroma-Systems Group, P.O. Box 366, Dayton, OH 45420, disk \$24.95.

**Chroma-Keys**, a 16K utility program that will reduce the amount of time required to key in magazine listings by adding a click sound when a key is pressed. Chroma-Systems Group, P.O. Box 366, Dayton, OH 45420, tape \$9.95.

**Program File**, a 16K Extended BASIC program that will organize your cassettes. Owls Nest Software, P.O. Box 579, Ooltewah, TN 37363, tape \$14.95.

**Kodomo-no-go**, a 16K or 32K Japanese named game for five in a row played on a 19 x 19 board. For one or two players and four skill levels. This game is similar to tic-tac-toe which is also included on both tapes. Intercept Enterprises, P.O. Box 4016, Cherry Hill, NJ 08034, 16K tape \$14.95, 32K tape \$19.95.

**Fundfile**, a 16K Extended BASIC portfolio and account management program for securities. Creates files for up to 900 transactions and 50 securities. Parsons Software, Dept. A, 118 Woodshire Drive, Parkersburg, WV 26101, disk \$27.95.

The *Seal of Certification* program is open to all manufacturers of products for the TRS-80 Color Computer, the TDP-100, or the Dragon-32, regardless of whether they advertise in *the Rainbow*. By awarding a *Seal*, the magazine certifies the program *does exist*, but this *does not* constitute any guarantee of satisfaction. As soon as possible, these hardware or software items will be forwarded to *the Rainbow's* reviewers for evaluation.

—Jutta Kapfhammer



# UNDERSTANDING PROBABILITY

## WILL IMPROVE YOUR ODDS

By Linda Nielsen

**H**aving spent a little time in Las Vegas recently (most of it at the Consumer Electronics Show, honest!), I thought it might be interesting to write a bit about programs to calculate the probabilities for some games of chance. This is my way of beginning to talk about the whole area of programming probability and statistics.

Interestingly enough, there is no generally accepted definition of probability among mathematicians, even though everyone has an intuitive understanding of what probability means. The classical interpretation of probability, and the one I will use, depends on the concept of equally likely events. For example, if you flip a coin and it has an equal chance of showing a "heads" or a "tails," then each of those outcomes has a  $\frac{1}{2}$  or 50 percent probability. It may be hard to imagine how equally likely events can be found in weather forecasting, but they are quite common in games of chance.

Let's examine what happens when a single die is thrown. Imagine this die is one of those six-sided kinds you once used in Monopoly or that



you see at crap tables in Las Vegas. Before you ever throw that cube, you know that when it lands, a side will be showing on the top. You also know that the top side will have between one and six spots on it. You know that you are not going to see one side with two hundred little spots on it. So you

simply throw away the idea of getting two hundred. A statistician would say that the probability of getting two hundred in one roll of an ordinary six-sided die is zero.

On the other hand, if the die has already been thrown but you can't see the top side, you can still imagine the probabilities. If you don't know what happened, from your perspective the outcome is still uncertain even though the event happened in the past.

Since you know for certain that the number of dots showing will be between one and six, we say that the probability of a whole number between one and six is equal to one. The probability of the sure or certain event is always equal to one.

If this is a fair die, then each of the outcomes one through six is equally likely. An unfair die is



# DANGER RANGER



What's blue and red, about an inch tall, able to leap across a Color Computer video display in a single bound, and destined to put Inky, Winky and Stinky out to pasture?

**Danger Ranger**, the newest character from **ScreenPlay**. That's who.

**Danger Ranger** isn't a clone of some moldy arcade game. It isn't like any video game you've ever seen. It's faster. More challenging. More **fun**.

Your joystick controls Danger Ranger on his mission to make the universe safe for Mom, Brotherhood and The American Way. First, our hero finds himself in the surrealistic 'Chamber of Pasha,' which consists of five consecutive platforms. Danger Ranger has to blast his

way through radioactive bats and roving eyes to pick up the ten keys that may spell the difference between survival and death for the human race!

If Danger Ranger can muster enough skill and courage to survive those challenges, he'll enter the 'Acid Chamber.' Here, not only do demons guard the treasure boxes he wants to collect, but fatal drops of acid fall from the ceiling and rise from the floor. Not a nice way to make a living - but it makes one heck of a video game.

**Danger Ranger**, from **ScreenPlay**.

Poor Winky. Lucky you.

16K Tape ..... \$24.95  
No Extended Basic Required

**ScreenPlay™**

1-800-334-5470

P.O. Box 3558 Chapel Hill, NC 27514

\* Radio Shack and Color Computer are trademarks of Tandy Corp.

one of those that usually or always shows a particular number on the top and you wouldn't want to mess with one like that. (In a future article I will discuss how you could write a program to do a good job of guessing if a particular die is a fair one or not.) If each of the numbers, one through six, is equally likely then probability of any particular number coming up must be 1/6. If we built a fair die with four sides numbered one through four, then the probability of each number between one and four being the number on the bottom would be 1/4. Similarly, a fair, 20-sided die numbered from one to 20 has a 1/20 chance of showing each number between one and 20 and a zero probability of any other outcome.

The probability of getting a number less than five on a six-sided die would be the probability of getting a one or a two or a three or a four. It isn't possible to get both a two and a three in one roll so we can add the probabilities of one, two, three and four to arrive at the probability that the number will be less than five. That is  $1/6+1/6+1/6+1/6$  or  $4/6=.66667$ .

Now we are ready to write a simple program to calculate the probability of some outcomes from a single throw of an "N" sided die. First clean up the screen, then query the user for the number of sides on the die.

```
100CLS:INPUT"HOW MANY SIDES ON THE DIE";N
```

Next calculate the probability of each number using the formula: probability=1/number of sides.

```
110P=1/N:PRINT"THE PROBABILITY OF EACH NUMBER FROM 1 to ";N;"IS";P
```

Next, put in a program loop to calculate the probability that the number of the die will be less than each of the numbers from 1 to the highest number that exists on the die. Statisticians call this a cumulative probability table and you can see why:

```
120 FOR J=1 TO N:T=0:FOR K=1 TO J:T=P+T:NEXTK
130PRINT"PROBABILITY OF <=";J;"IS ";
140PRINT USING "#.#####";T: NEXT J
```

If you want the program to return to the beginning to accept new parameters, then add these lines:

```
160 R$=INKEY$:IF R$="" THEN 160
170 GOTO 100
```

If you want the cumulative probability table to be sent to the printer then change line 140 and add line 150:

```
140 PRINT USING"#.#####";T;
150 PRINT#-2,"THE PROBABILITY OF <=";J;" = ";T;
NEXT J
```

Now let us consider a more interesting question. Most games of chance involve throwing more than one die. The most common one I know of is the game of craps in which two, six-sided dice are thrown. But there are also games like *Dungeons and Dragons* which use one or more four, six, eight, twelve and twenty-sided dice. Next, we will write a program to determine the probability of any selected number when you throw from one to five "N" sided dice. Clean up the screen and ask the user for the number of dice and the number of sides on each of the die.

```
100CLS:INPUT "HOW MANY DICE (1-5)";D : INPUT
"HOW MANY SIDES";N
```

Suppose we are throwing three, four-sided dice. Each of these dice is an equilateral pyramid with sides numbered one through four. When it lands there are three sides showing and one facing down. Imagine that the dice are different colors so we can distinguish among the first, second and third die. The first die has a 1/4 chance of having a one on the bottom side. Assuming, (and it seems a safe assumption) that the dice don't influence each other, the second and third die also have a 1/4 chance of showing a one on the bottom. Then the probability of a total throw of three is  $(1/4)*(1/4)*(1/4)$  or 1/64 which is 0.015625.

Consider the event that the first die has a three, the second die has a two and the third die has a one on the bottom. This exact event also has a probability of  $(1/4)*(1/4)*(1/4)$  or 0.015625. Notice, however, that the sum of the die is now 3+2+1 or six, and we can get a six in several different ways. In tabular form we could get a six by:

| First Die | Second Die | Third Die |
|-----------|------------|-----------|
| 1         | 1          | 4         |
| 1         | 4          | 1         |
| 4         | 1          | 1         |
| 1         | 2          | 3         |
| 1         | 3          | 2         |
| 2         | 1          | 3         |
| 2         | 3          | 1         |
| 3         | 1          | 2         |
| 3         | 2          | 1         |
| 2         | 2          | 2         |

## CONVERT YOUR PICTURES INTO HARD COPY

CATCH THAT COLOR PMODE3

PICTURE ON PAPER (USING

A CGP-115 COLOR PLOTTER)

- Machine language subroutines for speed
- Auto start from cassette
- Works with Micro Painter
- Will print pictures from cassette
- Includes sample picture - American Flag

Just \$14.95 plus \$1.50 postage and handling

To: All-American Ultralight Industries/ (AUI)  
1144 Kingston Ln.  
Ventura, Calif. 93001



In all there are ten different ways that we could get a six from the roll of three four-sided dice. Each of these ten different sequences is equally likely. That is, each of the sequences has a probability of 0.015625. Nevertheless, when rolling several dice, we are usually interested in the sum and not in the precise order of each die. So if we are interested in the probability of a six in this example it would be 0.015625 + 0.015625 + 0.015625 etc for ten times. More simply, that is 10 x 0.015625 or 0.15625.

We want to use our program to calculate the probability of each simple (or equally likely) event and then add up all the occurrences of this particular event. The next line of the program calculates the probability of each simple event:

```
110 P=(1/N)ID
```

The next line of the program asks the user what number is wanted and sets the program variables to zero:

```
120 INPUT"YOU WANT": T=0: E=0: F=0: G=0: H=0: M=0
```

Then we want to calculate the occurrences of the chosen number, L, over all the dice and all the numbers one through N:

```
130 IF D=1 THEN T=P: GOTO300
140 IF D>4 THEN FOR E=1 TO N
150 IF D>3 THEN FOR F=1 TO N
160 IF D>2 THEN FOR G=1 TO N
170 IF D>1 THEN FOR H=1 TO N
180 FOR M=1 TO N
190 Z=E+F+G+H+M
200 IF Z=L THEN T=P
210 NEXT M:NEXT H: IF D=2 THEN 300
220 NEXT G: IF D=3 THEN 300
230 NEXT F: IF D=4 THEN 300
240 NEXT E
300 ?"YOUR PROBABILITY IS ";PRINT USING
 "#.#####";T
310 GOTO 110
```

This program works. (Whew! I'm so proud!) It runs quite slowly if you have lots of sides on your dice. I imagine there are some programmers out there who can improve on my system, and I would appreciate hearing from them.

I seem to have left you with lots of dice that are hard to build. Can you imagine a one-sided die? Well, I can't either, but try it anyway because it will demonstrate something about probability. Remember the probability of the sure or certain event is always one. Moreover, these programs are not limited to dice games. If you have cards or balls or slips of paper numbered one through "N," the outcome from one random draw is the same as throwing one die. If you return your draw, mix up the items and draw again; that is like throwing two "N" sided dice. Statisticians call this sampling with replacement because if you get a two on the first draw you can get a two on a later draw, also. In other words, items are not removed from the pool of possibilities when they are chosen. Next time I will discuss how you might write a program to determine the probabilities of some card games where the cards are dealt without replacement.

One last note about Las Vegas. From the perspective of classical statistics, the house will always win. Nevertheless, if you enjoy gambling you can consider it entertainment and enjoy your fling. I had a wonderful time playing the video Black Jack and Poker. The screen graphics were stunning



PO Box 366  
Dayton, Ohio 45420

#### CCADS

A full 6809 machine language monitor with line assembler and disassembler. All you need to debug machine language programs. (ML, 16k or 32k)  
Cassette \$19.95 or Disk (With Source) \$23.95


#### UNLOCK

A complete disk backup utility. Features included are initialization of any track; copy any track and correct I/O errors, or leave them intact; and verify any track. Track numbers upto track 80 may be used at any time. (ML, 16k or 32k)  
Disk (With Source) \$24.95

#### DSKMON

Examine and fix sector data, also includes disk verify, file information display, and selective disk backup. (ML, 16k or 32k)  
Disk (With Source) \$24.95

#### Utilities

Chroma-Keys -- Define function keys and save them to disk or cassette. (ML, 16k or 32k)  
Cassette \$9.95 or Disk (With Source) \$13.95 

Spooler -- Print disk files or the basic program in memory without waiting. (ML, 64k only)  
Cassette \$11.95 or Disk (With Source) \$15.95

#### Games

Prospector -- An ECB Hi-Res graphics game. Can you get the gold out of the mine? (ECB, 16k or 32k)  
Cassette \$7.95

Jump-A-Peg -- A Hi-Res version of an ancient strategy game. (ECB, 16k or 32k)  
Cassette \$7.95

#### Miscellaneous

Clock -- A software real-time clock program for the CoCo. Warning: The clock will stop during tape I/O. (ML, 16k or 32k)  
Cassette \$9.95 or Disk (With Source) \$13.95

Chroma-Systems Group  
PO Box 366  
Dayton, Oh 45420

Please include \$1 for shipping and handling per item. Ohio residents please add 6% sales tax.

and at \$.25 the price was low enough for my entertainment budget. Remember something else: even unlikely events do happen. If the probability of winning is only 0.01 you can still win. Just don't try it too often!

*(Ms. Nielsen has taught economics and statistics in several universities for the past 10 years.)*

Listing 1:

```

100 CLS:INPUT"HOW MANY SIDES ON
THE DIE";N
110 P=1/N:PRINT"THE PROBABILITY
OF EACH NUMBER FROM 1 TO";N;"IN
";P
120 FOR J=1 TO N:T=0:FOR K=1 TO
J: T=P+T:NEXT K
130 PRINT"PROBABILITY OF <=";J;"
IS ";
140 PRINT USING "#.#####";T:
150 PRINT#-2,"THE PROBABILITY OF
<=";J;" = ";T:NEXT J
160 R$=INKEY$: IF R$="" THEN 160
170 GOTO 100

```

Listing 2:

```

100 CLS:INPUT"NUMBER OF SIDES";N
110 INPUT"NUMBER OF DIE (1-5)";D
120 P=1/(N^D)
140 INPUT"YOU WANT";L:T=0:E=0:F=
0:G=0:H=0:M=0
150 IFD>4 THEN FORE=1TON
160 IFD>3 THEN FORF=1TON
170 IFD>2 THEN FORG=1TON
180 IF D>1 THEN FORH=1TON
190 IFD=1THENT=P:GOTO300
195 FORM=1TON
200 Z=E+F+G+H+M
220 IFZ=L THEN T=T+P
240 NEXTM:NEXTH:IFD=2THEN300
250 NEXTG:IFD=3THEN300
260 NEXTF:IFD=4THEN300
270 NEXTE
300 PRINT"YOUR PROBABILITY IS ";
:PRINTUSING"#.#####";T
320 GOTO120

```

# VOICE RECOGNITION

For your 16K TRS-80 Extended Basic Color Computer

By Cary D. Perttunen

Using your cassette recorder's condenser microphone, the COLOR TALK TO ME software package can let you use your own voice as an alternate means of input for any of your BASIC programs. Over 200 words can be stored in 16K RAM. With a little practice, you can attain from 80% to over 90% accuracy for most applications.

The COLOR TALK TO ME Software Package includes:

- COLOR TALK TO ME machine language subroutine
- The BASIC subroutine which can merge COLOR TALK TO ME with your programs
- Complete instructions on how to use and incorporate COLOR TALK TO ME in BASIC programs
- Two application programs:
  1. VOICE CALC- Use your voice to enter arithmetic problems and VOICE CALC will display the solution.
  2. SCREEN PAINTER- Say a color and the screen will be painted that color.

ALL OF THIS ON TWO CASSETTES FOR ONLY \$49.95!!!

ColorSoft Software Co. will soon be releasing voice recognition programs which can be used once you buy COLOR TALK TO ME. Coming soon: Connect More, Crosswords & more!

ATTENTION PROGRAMMERS: ColorSoft Software Co. will market original voice recognition programs using COLOR TALK TO ME with excellent royalties in return.

Dealer  
Inquiries  
Invited

Send check or money order to: ColorSoft Software Co.  
Add \$2.00 shipping  
11764 Raintree Ct.  
Utica, MI 48087



## Filmastr: A Handy Do-It-All Filing System For CoCo

One of the reasons that I bought a disk, aside from the inherent speed, was to enable me to explore more serious applications of my CoCo. Sure I like games, but it seemed to me to be a waste of computing power when all I was doing was eating "power dots," and protecting cities from being destroyed.

I took my first step in this direction when I bought a word processor. The next step I took was to write a program to keep track of my growing library of programs. After I wrote it, I started to think of other things that I wanted to keep track of. I did not want to have to write a new program for each application I could think of so I started to think about a "do-it-all" program. At about the same time I began to see ads for this type of program, so I figured that I would lay back and let someone else do the work for me.

*Filmastr* is just such a program. With it you can create and maintain just about any kind of file that you can think of. It features full screen editing of data, copying fields from one record to the next while adding information, machine language sorting, record selection, print formatting, and of course, adding, changing and deleting of the records in your file.

When the program is *RUN*, a title screen appears with a menu of two choices. You can either define a new file or load an existing one. Since you must define your file before you can do anything else with it I will discuss this first.

The first thing you do is to give your file a title (or name as I prefer to call it). You then define all of your fields and their lengths. While you are doing this the fields as well as the title can be placed almost anywhere on the screen. Also each field is assigned a number for future reference. I thought that this was a nice feature, because it allows you to determine exactly how the screen will look when you are using it later on.

Once your file is defined you are told how many fields it has, the length of the file and how many records it can hold. This definition is then saved, and you are ready to start working with your file.

In order to begin working with your file you must first load it. This may seem like the obvious thing to do, but it also applies to files that have just been defined that have no records in them yet. After your file is loaded, the bottom of the screen shows your choices at this point.

The first thing that you will be doing is to add some records to your file. This is done using the screen format that you defined previously. Entering data is done one field at a time, and you can use the arrow keys to correct any mistakes before you hit *ENTER*.

From this screen you can also load in another file. This requires that both files be defined in exactly the same manner, and allows you to merge several small files into a larger one. More on this later. This screen also has the Sort option, which will allow you to put your file into any sequence. You can sort on more than one field but you cannot sort in descending order. The other options here are to End the program, which will ask you if you have saved your file, and to List your file.

When listing your file, you can browse through it quickly on the screen using the arrow keys. If you hit the *BREAK* key, another menu is presented at the bottom of the screen. This menu has six additional options. From it you can change or delete records. These are pretty straightforward, so I won't go into them any further.

The Select option allows you to work with a subset of the file. Any field can be used in the selection. You can also use a portion of a field, as well as two relational operators. For example, you can select name equal to "S" for all names starting with the letter "S," or name equal to "PETERS" for all names of "PETERS," "PETERSON," or whatever. The relational operators can be used, for example, to select all Zip Codes greater than "20000."

The Save option allows you to save your file. The interesting thing here is that your file is saved based on the records that have been selected. If the Select option has not been used, then all the records are saved. However, if you have selected records, then only those selected will be saved. These smaller files can be used just like any other and can always be merged together, which provides a good amount of flexibility.

The Sum option allows you to add up any numeric field and will give you a total of the field. By combining this feature with the Select feature, you can get totals for any part of your file.

The Print option (you guessed it) will print your file to the screen or printer. In order to print a file you must define a "print format." This format tells the program which fields are to be printed, and in what order. You can also add spaces or whatever you like between the fields, and you can print the fields on several lines. An example of this would be if you wanted to print name and address labels. You would print the name and address on separate lines, the city followed by a comma and a space, the state followed by a space, and the Zip Code. Although this sounds very flexible, you cannot format numeric fields with embedded commas or periods, and you cannot produce listings with headings or page numbers—very basic features in my opinion. Also when listing to the screen, you will have to hit the shift and "@" keys to stop it from scrolling off the screen.

All things considered, *Filmastr* is a very good utility program. The documentation is very well written, and will guide the first time user through the various options with no problem. If you want to do some serious work with your CoCo, I recommend that you check it out.

(The Computer House, Box 1051, DuBois, PA 15801,  
\$29.95 tape, \$34.95 disk)

—Gerry Schechter

### 80C VOICE SYNTHESIS !!!

BUILD YOUR OWN VOTRAX SC-01 SPEECH MODULE THAT PLUGS INTO THE SERIAL PORT. ENJOY THE FUN THAT COMES WITH BEING ABLE TO PROGRAM YOUR SYSTEM TO SAY ANY TEXT YOU WISH. USE IT TO ENHANCE GAMES, AS A TEACHING AID, OR TO HELP A DISABLED FRIEND. NO SPECIAL TOOLS REQUIRED. SIMPLE STEP BY STEP INSTRUCTIONS USING EASY TO OBTAIN RADIO SHACK STOCK PARTS (Except the VOTRAX chip, for which I provide a supplier's list). COMPLETE INSTRUCTIONS, INCLUDING SAMPLE PROGRAMS. \$5.00

\* OR \*

CUSTOM MADE PRINTED CIRCUIT BOARD. REDUCES WIRING TO A MINIMUM. INCLUDING SAMPLE PROGRAMS AND INSTRUCTIONS. \$15.00 PLUS \$1.00 POSTAGE

SEND CHEQUE OR MONEY ORDER TO: B.T. PEARCE  
763 MULVEY AVE.  
WINNIPEG MANITOBA  
CANADA R3M 1G4

Manitoba residents include 5% sales tax

## Alcatraz II Unsuccessful As Great Escape

*Alcatraz II* is a graphic escape game using low resolution graphics (P MODE 1). In your role as a convict, you frantically try to escape from the penitentiary, avoiding guards, robots and the trained killer, the Minotaur. After *CLOADing* the Extended BASIC program, you start the game by choosing to use either the four arrow keys or the right joystick.

You maneuver your figure through a maze of square cell blocks, hoping to find a clear escape path from the wing. The exit of each wing is located on the right side of the screen. There are also guards in the wing who constantly patrol the hallways. Your figure moves at the same speed as the guards, so there is no chance of being outrun. If a guard catches you, the escape is unsuccessful and the game is over. Between some of the blocks are closed gates. You cannot pass through the closed gates, but when a guard passes through a gate, he opens it, leaving you a way out. The key to the game is to lure the guards toward you. If a guard sees you in his hallway, he will move toward you, opening all gates in his way. If you take too much time in a wing, you should expect to see the hall lasers. After a short buzzing alarm, five lines slowly emerge down each hall, from either the right or top of the screen. You must quickly move to a safe hallway to avoid being zapped. Unfortunately, the lasers will close any previously opened gates. If you reach the exit of the wing, your score will be added up and displayed. After you escape each wing, the number of guards in each wing increases. You must get through two more identical wings before encountering the Minotaur.

In the fourth wing, you will see the Minotaur, two walls, and three force fields with their corresponding switchboxes. The Minotaur moves in random directions, but moves faster than you, so you have to react quickly. Once in the Minotaur's lair, you must deactivate the force fields by entering the switchboxes. You may hide from the Minotaur in the switchboxes because he is too large to enter. You cannot pass through a wall, but the Minotaur can, leaving a hole in the wall. Waiting for the Minotaur to destroy a particular segment in the wall can take a considerable length of time, a wait that is quite tedious.

After eluding the Minotaur, you must get through two more wings to complete the escape of the first building. The

second and third buildings are identical to the first in structure, except for additional robot guards. The robot guards move slower than you, but they always move directly toward you, forcing you to make quicker decisions than before. You must take advantage of the robots' slower speed to avoid being captured. The great escape is over when you exit the third building.

On the opposite side of the tape of *Alcatraz II*, there is an instruction program. This program explains the important aspects of playing, and introduces you to the characters. Personally, I would rather read instructions on the screen than on paper any day. The instruction program also gives you hints on playing and automatically starts loading the main program. The documentation also explains the bug in ROM which may yield a SN error because of the *PCLEAR* statement. If this occurs, simply type *RUN* again and all should be well.

The movements of the figures are slow and choppy due to the limitations of Extended BASIC. The program also makes use of sound and keeps track of the high score.

*Alcatraz II*, I believe, does not compare with the high quality of some other games of this type for the Color Computer, but the price is not high, either.

(Spectral Associates, 3416 South 90th Street, Tacoma, WA 98409, \$8.95 on tape)

—Joe Esposito

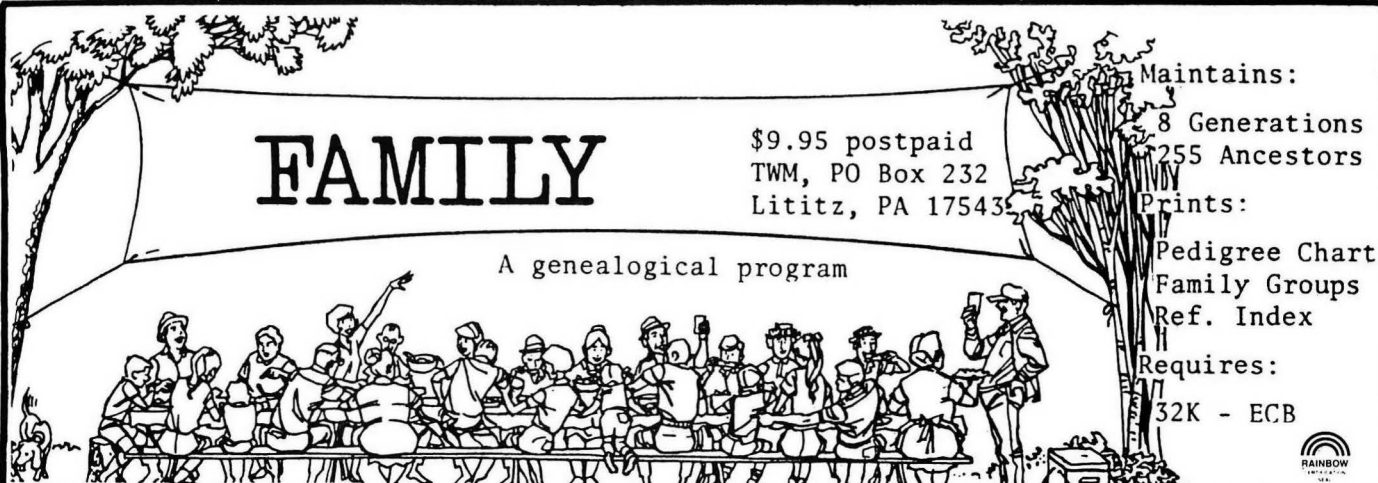
## About Your Subscription

Your copy of the *RAINBOW* is sent third class mail and, for subscribers in the United States, the date of mailing is printed on the label. If you do not receive your copy by the 25th of any month, send us a card and we will mail another immediately via first class mail.

You must notify us of a new address when you move. Notification should reach us no later than the 15th of the month prior to the month in which you change your address. Sorry, we cannot be responsible for sending another copy when you fail to notify us.

Your mailing label also shows an "account number" and the subscription expiration date. Please indicate this account number when renewing or corresponding with us. It will help us help you better and faster.

For Canadian and other non-U.S. subscribers, there may be a mailing address shown that is different from our editorial office address. Do not send any correspondence to that mailing address. Send it to our editorial offices at P.O. Box 209, Prospect, KY 40059. This applies to everyone except those whose subscriptions are through our distributor in Australia.



# FAMILY

A genealogical program

Maintains:

- 8 Generations
- 255 Ancestors


Prints:

- Pedigree Chart
- Family Groups
- Ref. Index

Requires:

1 32K - ECB

\$9.95 postpaid  
TWM, PO Box 232  
Lititz, PA 17543





## Robottack: A Fast-Paced, High-Res Shoot 'em up

When *Robottack* arrived for review, the first thing that struck my mind was, "Oh no, not another clone of the famous *Beserk* game! Can't they think of anything new?" Well, I'm glad to say I was wrong (maybe even *dead* wrong).

Although there are robots and humans involved in this game, it does not incorporate the mazes and rooms of the well known arcade game. As a matter of fact, one of the neat features of this game is the ability to move freely all around the screen. You are the "super human" who must fight off the attacking robots and save the remaining humans from destruction. The left joystick is used to move your human anywhere on the screen, and the right one to shoot in any of eight directions. This takes a little getting used to at first, not only to coordinate the movement between the two joysticks, but to "untrain" yourself that the fire button shoots bullets. In this game, the fire button is used only to start playing.

As you successfully fend off the robots, you move to another "frame," and the action starts over again, only with more difficulty. I don't know how many frames there are, but after about 10 minutes of play, I progressed to frame 11 and achieved a score of 28,000 points. I'll spend a few hours trying to reach the heights of *Robottack* fame. There are plenty of obstacles to overcome, however, since there is not just one kind of robot, but guardian robots, gunner robots, mind robots, and bombs. The bombs look like "X's," and they chase after you very *very* fast.

The beginning of each new frame starts off with great audio/visual effects, as your super-human "materializes" in the center of the screen, similar to the famous *Imagic* game, *Demon Attack*. At the same time, your foes appear at various random points on the playfield, wasting no time as they start to seek you out. Each new frame brings more vicious robots and faster action. I've discovered that it's not necessary to clear each new frame entirely of robots, which leads me to believe that new playfields are achieved by reaching certain point levels.

Although many games claim to be (and indeed are) in machine language, that doesn't necessarily mean that they're done well. All too often, the sound effects suffer for the graphics, or vice versa. Intracolor did a good job with this one, taking full advantage of the Color Computer's sound and graphics abilities. It is a fast-paced, high-resolution, arcade style shoot 'em up, and for those of you who like that kind of thing, this is a good bet. It's designed for one or two players, with the top five scores displayed on the screen.

They were thoughtful enough to include a PAUSE feature which you activate by pressing the space bar. But my game has paused long enough—it's time to get to frame 12.

(Intracolor Communications, P.O. Box 1035, East Lansing, MI 48823, \$24.95 cassette, \$27.95 disk)

—Bob Safir

## New Frog Is A Prince Of A Program

Tom Mix Software has done it again! Their newest addition to the company's list of software is *The Frog*.

*The Frog* is an almost flawless derivative of *Frogger*. Everything in *Frogger* is here in *The Frog*. There are lady frogs, treacherous diving turtles, pesky flies, hungry alligators and deadly snakes to contend with.

In case any of you out there have not seen *Frogger* or *The Frog*, here is a description of how the game works. The object is for you, the frog, to travel from the bottom of the screen to the top and safety. Sound easy? Not quite.

There are cars, trucks and other vehicles that would love to run your green body into the pavement. There are about five rows of this before you reach the middle of the screen—if you live that long. Here is a safe place from the cars, but, on screen three, a snake moves back and forth when you reach this spot and would like frog legs for dinner.

Ahead of you are another five rows of water and numerous logs and turtles move back and forth in different directions at varying speeds. Unfortunately, *your frog can't swim* and getting your feet wet is fatal. Now we jump on a group of turtles and wait there. Oh no, their backs are only showing now; better get off before they submerge and we get all wet. So we quickly jump onto a passing log.

What do we have here? A girl frog! Like a lady or gentleman you'll help her get across the river, for an extra 200 points. Now we jump on another faster log and—what's this?—a snapping alligator is moving towards us! Don't jump into gator's jaw or we will be someone's lunch. We'll jump on his back.

Now we slowly move along watching the clock in order not to run out of time. Here comes a home safe spot, our destination. Before we jump, a fly appears in that spot, so now, instead of being eaten, let's eat the fly and get 200 extra points. We must do that five more times before we go to another screen and a harder challenge.

The detail of this game is amazing. Some of the cars have exhaust coming out of them as they move. The logs roll. The turtle's legs move. When turtles dive there are bubbles. The fly flaps his wings. The gator's jaws and tail move and, when you are killed, a skull and crossbones appear over the spot. *The Frog* uses the highest graphics mode and is written in machine language.

*The Frog*, fortunately, takes the middle ground in difficulty. It is not too hard as to be impossible, but not too easy as to be boring, and after some practice you can actually get good.

(Tom Mix Software, 3424 College N.E., Grand Rapids, MI 49505, \$27.95 on tape, \$30.95 on disk)

—Jeff White



# RAINBUG III

Part three of a series on our new machine language monitor being developed by the author, *Rainbow* Technical Editor, Dan Downard



In last month's installment we added a section of machine code to the *Rainbug* monitor showing how to calculate offsets and mentioned the different types of addressing used in a 6809 microprocessor. This month we will add the facility of calculation of postbytes, such as those used in indexed and indirect addressing of *Rainbug* and discuss the different types of instructions understood by the machine. If you are having trouble inputting the machine code into your CoCo look in this issue under "Rainbow Info" for a quick BASIC program for inputting machine language routines. Remember the starting address for *Rainbug* is \$3000 in the listing, but it can be changed to any address you desire. Until you are sure it is functioning properly it is best to leave it at \$3000.

### 6809 Instructions

Machine code instructions can be divided into five major categories according to the affected registers:

| Instructions                                | Register(s) |
|---------------------------------------------|-------------|
| •8-Bit Accumulator and Memory Instructions  | A,B         |
| •16-Bit Accumulator and Memory Instructions | D           |
| •Index/Stack Pointer Instructions           | X,Y,U,S     |
| •Branch Instructions                        | CC          |
| •Miscellaneous Instructions                 | All         |

For your reference we are including a list of all instructions in Table 1 through 5. By looking at the mnemonics and the description following them you can follow assembly texts in any article as they are used exclusively with the addressing

*(Dan Downard is an electrical engineer and has been involved in electronics for 24 years through ham radio (K4KWT). His interest in computers began about five years ago and he has built several 68XX systems.)*

modes discussed in last month's segment to describe all of the available machine code functions. We will examine an instruction from each set to familiarize us with the procedure.

### 8-Bit Accumulator and Memory Instructions

For our example let's look at the ADDA instruction, or add memory to accumulator A. This particular instruction is also valid for the B register, thus the notation ADDB. It can be used with all but inherent addressing modes since the value of any memory location is added to the A register and the a register is replaced with this value. Certain bits of the CC (Condition Code) register are affected by this operation and for anything but simple binary arithmetic must be examined for future operations.

### 16-Bit Accumulator and Memory Instructions

The STD instruction stores the 16-bit value in the D register, which is the A and B registers combined, at any memory location depending on the addressing method in use. How can you store a 16-Bit value at one 8-Bit memory location? You can't. The 16-Bit value is actually stored at the memory address specified and the next consecutive byte. Again, the inherent mode is the only type of addressing that can't be used.

### Index/Stack Pointer Instructions

What happens when you want to store a value for future reference such as a return address for a subroutine. The microprocessor does this automatically when you execute certain instructions through the use of the S, or Stack Pointer register. In reality, this is a memory location in RAM whose location is recognized by the 6809 through your instruction such as LEAS. If you notice from Table 3 there are actually two stacks, the S and U registers. The S register is always



recognized by the microprocessor as the primary, or hardware, stack. Any register can be temporarily saved for future use by instructions such as PSHS or retrieved by the PULS. What these instructions do is provide a method of organization for logical temporary storage of variables and addresses.

**Table 1**  
**8-Bit Accumulator and Memory Instructions**

| Instruction     | Description                                        |
|-----------------|----------------------------------------------------|
| ADCA, ADCB      | Add memory to accumulator with carry               |
| ADDA, ADDB      | Add memory to accumulator                          |
| ANDA, ANDB      | And memory with accumulator                        |
| ASL, ASLA, ASLB | Arithmetic shift of accumulator or memory left     |
| ASR, ASRA, ASRB | Arithmetic shift of accumulator or memory right    |
| BITA, BITB      | Bit test memory with accumulator                   |
| CLR, CLRA, CLRB | Clear accumulator or memory location               |
| CMPA, CMPB      | Compare memory from accumulator                    |
| COM, COMA, COMB | Complement accumulator or memory location          |
| DAA             | Decimal adjust A accumulator                       |
| DEC, DECA, DECB | Decrement accumulator or memory location           |
| EORA, EORB      | Exclusive or memory with accumulator               |
| EXG R1, R2      | Exchange R1 with R2 (R1, R2=A, B, CC, DP)          |
| INC, INCA, INCB | Increment accumulator or memory location           |
| LDA, LDB        | Load accumulator from memory                       |
| LSL, LSLA, LSLB | Logical shift left accumulator or memory location  |
| LSR, LSRA, LSRB | Logical shift right accumulator or memory location |
| MUL             | Unsigned multiply (A x B → D)                      |
| NEG, NEGA, NEGB | Negate accumulator or memory                       |
| ORA, ORB        | Or memory with accumulator                         |
| ROL, ROLA, ROLB | Rotate accumulator or memory left                  |
| ROR, RORA, RORB | Rotate accumulator or memory right                 |
| SBCA, SBCB      | Subtract memory from accumulator with borrow       |
| STA, STB        | Store accumulator to memory                        |
| SUBA, SUBB      | Subtract memory from accumulator                   |
| TST, TSTA, TSTB | Test accumulator or memory location                |
| TFR R1, R2      | Transfer R1 to R2 (R1, R2=A, B, CC, DP)            |

NOTE:  
A, B, CC, or DP may be pushed (pulled) either stack with PSHS, PSHU (PULS, PULU) instructions.

### Branch Instructions

Remember the offset calculator from last month's article? Offsets are used in conjunction with branch instructions to compare values in a program requiring a decision on how to proceed. I suppose a simple program is the best way to illustrate. Using the memory examine function of *Rainbug*, enter the following program into memory starting at \$2000.

```

$2000 8E A147 LDX #A147
$2003 A6 80 LDA ,X+
$2005 BD A30A JSR $A30A
$2008 8C A16F CMPX #A16F
$200B 26 F6 BNE $2003
$200D 39 RTS

```

This particular program should tell you what version of ROM you have in your computer. Notice that the routine printed the value of memory at the location of the X register and compared it each time with \$A16F. If it was not equal, another character was printed.

### Miscellaneous Instructions

This group of instructions is a grab bag of commands that are not directly related to any specific register. For example the JMP instruction tells the 6809 to change the value of the program counter, thereby moving program execution to a different address. Essentially when you execute an EXEC instruction in BASIC you are doing the same thing. Did you

**Table 2**  
**16-Bit Accumulator and Memory Instructions**

| Instruction           | Description                                  |
|-----------------------|----------------------------------------------|
| ADDD                  | Add memory to D accumulator                  |
| CMPD                  | Compare memory from D accumulator            |
| EXG D, R              | Exchange D with X, Y, S, U, or PC            |
| LDD                   | Load D accumulator from memory               |
| SEX                   | Sign Extend B accumulator into A accumulator |
| STD                   | Store D accumulator to memory                |
| SUBD                  | Subtract memory from D accumulator           |
| TFR D, R              | Transfer D to X, Y, S, U, or PC              |
| TFR R, D <sup>+</sup> | Transfer X, Y, S, U, or PC to D              |

NOTE:  
D may be pushed (pulled) to either stack with PSHS, PSHU (PULS, PULU) instructions.

notice the interrupt instructions? We will cover interrupts and condition codes next month.

### Rainbug

Two new commands are added to *Rainbug* this month. One was actually in the listing last month but omitted from the commands.

X Exit to BASIC

E Encode Postbyte

The X command is self explanatory and executes as soon as the key is depressed, so be careful. If hit by accident an EXEC command from BASIC will return you to *Rainbug*. The E command has the following syntax:

E ,X++

E HHHH,PCR

E H,X

## "SEE" Music!!

•The KALEIDOPHONE allows your Color Computer to "listen to" your hi-fi and display what it "hears" on your TV!

•Dedicated hardware lets the computer devote full-time to creating the displays, so breath-taking, animated pictures in full color are easy to program.

•Just plug the KALEIDOPHONE into hi-fi and joystick inputs.

•Do not confuse with imitations — the KALEIDOPHONE continuously delivers actual volume signals (64 levels in stereo). Works on any CoCo (16K recommended).

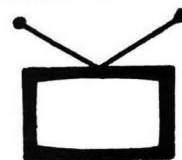
KALEIDOPHONICS, our users' newsletter (FREE with purchase) contains dozens of new display ideas in each issue — a literally infinite variety of patterns is possible!

•The KALEIDOPHONE is something really new. Great for parties! Educational too! Order Now!

•Only \$49.95 fully assembled including detailed instructions.

BONUS: free issue of KALEIDOPHONICS on cassette!

NEW SALEM RESEARCH  
West Main Street  
New Salem, Mass. 01355



Write for free  
sample program!

**KALEIDOPHONE**

The preceding examples are all mnemonics requiring a postbyte as part of the op-code. The E command will automatically calculate the postbyte for you. The letter "H" is input to indicate the number of hex bytes needed in the expression.

**Table 3**  
**Index/Stack Pointer Instructions**

| Instruction | Description                                              |
|-------------|----------------------------------------------------------|
| CMPS, CMPU  | Compare memory from stack pointer                        |
| CMPX, CMPY  | Compare memory from index register                       |
| EXG R1, R2  | Exchange D, X, Y, S, U or PC with D, X, Y, S, U or PC    |
| LEAS, LEAU  | Load effective address into stack pointer                |
| LEAX, LEAY  | Load effective address into index register               |
| LDS, LDU    | Load stack pointer from memory                           |
| LDX, LDY    | Load index register from memory                          |
| PSHS        | Push A, B, CC, DP, D, X, Y, U, or PC onto hardware stack |
| PSHU        | Push A, B, CC, DP, D, X, Y, X, or PC onto user stack     |
| PULS        | Pull A, B, CC, DP, D, X, Y, U, or PC from hardware stack |
| PULU        | Pull A, B, CC, DP, D, X, Y, S, or PC from hardware stack |
| STS, STU    | Store stack pointer to memory                            |
| STX, STY    | Store index register to memory                           |
| TFR R1, R2  | Transfer D, X, Y, S, U, or PC to D, X, Y, S, U, or PC    |
| ABX         | Add B accumulator to X (unsigned)                        |

**Summary**

It looks like this four-part series is going to be extended another month out of necessity to cover all of the material intended in short, hopefully digestible, segments. Next month we will cover interrupts and the CC register. We will add tape and disk commands to *Rainbug* leaving breakpoints for last. So far the starting, ending and execute addresses are \$3000, \$3302, \$319E. Notice that the lookup table is different due to addition of a new command. See you next month!

**Table 4**  
**Branch Instructions**

| Instruction              | Description                              |
|--------------------------|------------------------------------------|
| <b>SIMPLE BRANCHES</b>   |                                          |
| BEQ, LBEQ                | Branch if equal                          |
| BNE, LBNE                | Branch if not equal                      |
| BMI, LBMI                | Branch if minus                          |
| BPL, LBPL                | Branch if plus                           |
| BCS, LBCS                | Branch if carry set                      |
| BCC, LBCC                | Branch if carry clear                    |
| BVS, LBVS                | Branch if overflow set                   |
| BVC, LBVC                | Branch if overflow clear                 |
| <b>SIGNED BRANCHES</b>   |                                          |
| BGT, LBGT                | Branch if greater (signed)               |
| BVS, LBVS                | Branch if invalid twos complement result |
| BGE, LBGE                | Branch if greater than or equal (signed) |
| BEQ, LBEQ                | Branch if equal                          |
| BNE, LBNE                | Branch if not equal                      |
| BLE, LBLE                | Branch if less than or equal (signed)    |
| BVC, LBVC                | Branch if valid twos complement result   |
| BLT, LBLT                | Branch if less than (signed)             |
| <b>UNSIGNED BRANCHES</b> |                                          |
| BHI, LBHI                | Branch if higher (unsigned)              |
| BCC, LBCC                | Branch if higher or same (unsigned)      |
| BHS, LBHS                | Branch if higher or same (unsigned)      |
| BEQ, LBEQ                | Branch if equal                          |
| BNE, LBNE                | Branch if not equal                      |
| BLS, LBLs                | Branch if lower or same (unsigned)       |
| BCS, LBCS                | Branch if lower (unsigned)               |
| BLO, LBLO                | Branch if lower (unsigned)               |
| <b>OTHER BRANCHES</b>    |                                          |
| BSR, LBSR                | Branch to subroutine                     |
| BRA, LBRA                | Branch always                            |
| BRN, LBRN                | Branch never                             |

**Table 5**  
**Miscellaneous Instructions**

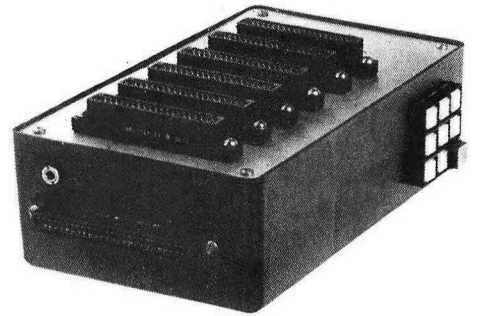
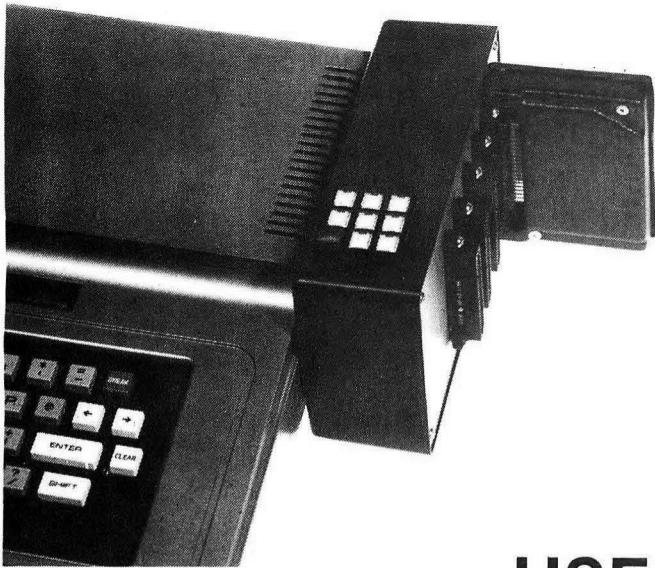
| Instruction     | Description                                          |
|-----------------|------------------------------------------------------|
| ANDCC           | AND condition code register                          |
| CWAI            | AND condition code register, then wait for interrupt |
| NOP             | No operation                                         |
| ORCC            | OR condition code register                           |
| JMP             | Jump                                                 |
| JSR             | Jump to subroutine                                   |
| RTI             | Return from interrupt                                |
| RTS             | Return from subroutine                               |
| SWI, SWI2, SWI3 | Software interrupt (absolute indirect)               |
| SYNC            | Synchronize with interrupt line                      |

*Reprinted from the MC6809 - MC6809E Microprocessor Programming Manual with the permission of Motorola, Inc.*

|         |      |       |                    |                      |        |
|---------|------|-------|--------------------|----------------------|--------|
|         |      | 00100 | *RAINBUG           |                      |        |
|         |      | 00110 | *DAN DOWNARD       | REV 2                |        |
|         |      | 00111 | *LINES 100-2550    | AND LINES            |        |
|         |      | 00112 | *2885-3080         | APPEARED IN PARTS    |        |
|         |      | 00113 | *1                 | AND 2 OF THIS SERIES |        |
| 3000    |      | 00120 | ORG                | \$3000               |        |
|         | 31A8 | 00130 | CNDBAD             | EQU                  | ERROR  |
|         | 008C | 00140 | SKIP2              | EQU                  | \$8C   |
|         | A000 | 00150 | POLCAT             | EQU                  | \$A000 |
|         | A002 | 00160 | CHROUT             | EQU                  | \$A002 |
|         |      | 02555 | *TABLE OF COMMANDS |                      |        |
|         | 3205 | 02560 | CMDTBL             | EQU                  | *      |
|         | 42   | 02570 | FCC                | /B/                  |        |
| 3206    | 00F2 | 02580 | FDB                | BKPT-*               |        |
| 3208    | 43   | 02590 | FCC                | /C/                  |        |
| 3209    | 00F0 | 02600 | FDB                | CALL-*               |        |
| 320B    | 44   | 02610 | FCC                | /D/                  |        |
| 320C    | 00EE | 02620 | FDB                | DISK-*               |        |
| 320E    | 45   | 02630 | FCC                | /E/                  |        |
| 320F    | 0054 | 02640 | FDB                | ENCDE-*              |        |
| 3211    | 47   | 02650 | FCC                | /G/                  |        |
| 3212    | 00E9 | 02660 | FDB                | GO-*                 |        |
| 3214    | 4C   | 02670 | FCC                | /L/                  |        |
| 3215    | 00E7 | 02680 | FDB                | LOAD-*               |        |
| 3217    | 4D   | 02690 | FCC                | /M/                  |        |
| 3218    | FDE8 | 02700 | FDB                | CMEM-*               |        |
| 321A    | 40   | 02710 | FCC                | /@/                  |        |
| 321B    | 00E2 | 02720 | FDB                | PRINT-*              |        |
| 321D    | 4F   | 02730 | FCC                | /O/                  |        |
| 321E    | 0017 | 02740 | FDB                | OFFS-*               |        |
| 3220    | 50   | 02750 | FCC                | /P/                  |        |
| 3221    | 00DD | 02760 | FDB                | PUNCH-*              |        |
| 3223    | 52   | 02770 | FCC                | /R/                  |        |
| 3224    | 00DB | 02780 | FDB                | REG-*                |        |
| 3226    | 53   | 02790 | FCC                | /S/                  |        |
| 3227    | 00D9 | 02800 | FDB                | STLEV-*              |        |
| 3229    | 54   | 02810 | FCC                | /T/                  |        |
| 322A    | 00D7 | 02820 | FDB                | TRACE-*              |        |
| 322C    | 56   | 02830 | FCC                | /V/                  |        |
| 322D    | 00D5 | 02840 | FDB                | VER-*                |        |
| 322F    | 57   | 02850 | FCC                | /W/                  |        |
| 3230    | FE5C | 02860 | FDB                | CWINDO-*             |        |
| 3232    | 58   | 02870 | FCC                | /X/                  |        |
| 3233    | 002A | 02880 | FDB                | EXIT-*               |        |
|         |      | 03085 | *ENCODE A POSTBYTE |                      |        |
| 3263 6F | E2   | 03090 | ENCDE              | CLR                  | , -S   |



# EXPAND YOUR COLOR COMPUTER



## USER 80C

### USER SELECTABLE EXPANSION REQUIREMENTS

- Activate your disk controller, ROM CARTRIDGES, EPROM board, or any device that normally operates in the expansion slot.
- Protects computer from electrical damage caused by experimental boards or by plugging/unplugging ROM CARTRIDGES and controllers with the power on.
- Gold inlay connector contacts for more reliable operation. Menu-driven software (included). Allows user to operate multiple slots at the same time. (e.g., transfer data from one slot to any other slot).
- Select any of 6 slots with push-button keys or programming.
- Attach additional USER 80C's for more expansion slots.
- Utilizes its own reset button, eliminating the need to continually press the reset behind the computer.
- Operates with a 9V battery eliminator (included). Power supply is independent of computer.
- 9V battery eliminator included.
- Has its own on/off switch with LED indicator.
- More to come: analog digital converter, parallel ports for printers and joysticks, four-channel scope.
- Production of experimental boards upon request. (Based on your schematics).

### USER 80C "Designed with the User in Mind" \$249.95

TERMS: Send certified check or money order for \$249.95, plus shipping, handling and applicable sales tax. (Personal checks take three weeks to process.) For shipping and handling include \$5.00 U.S., \$8.00 Canadian/Mexican, \$15 Overseas. Illinois residents include 5% Sales Tax. Prompt shipment. Dealer/Club inquiries invited.



#### J-NOR INDUSTRIES, INC.

6272 W. North Avenue  
Chicago, IL 60639  
Phones (312) 745-7541  
(312) 622-4555

Guaranteed for one  
full year (parts and labor)

|           |         |       |                        |                |         |      |       |                        |         |
|-----------|---------|-------|------------------------|----------------|---------|------|-------|------------------------|---------|
| 3265 5F   |         | 03100 | CLRB                   |                | 32A0 26 | F6   | 03350 | BNE                    | ENLP2   |
| 3266 30   | 8D 0048 | 03110 | LEAX                   | CONV1,PCR      | 32A2 E6 | 1F   | 03360 | LDB                    | -1,X    |
| 326A 17   | FF01    | 03120 | LBSR                   | INCH           | 32A4 EA | E4   | 03370 | ORB                    | ,S      |
| 326D 81   | 5B      | 03130 | CMPA                   | #5B            | 32A6 E7 | E4   | 03380 | STB                    | ,S      |
| 326F 26   | 07      | 03140 | BNE                    | EN2            | 32A8 30 | E4   | 03390 | LEAX                   | ,S      |
| 3271 86   | 10      | 03150 | LDA                    | #10            |         |      | 03395 | *PUT CHAR ON SCREEN    |         |
| 3273 A7   | E4      | 03160 | STA                    | ,S             | 32AA 17 | FEBB | 03400 | LBSR                   | OUT2HS  |
|           |         | 03165 | *NEXT CHARACTER        |                | 32AD 17 | FED3 | 03410 | LBSR                   | PCRLF   |
| 3275 17   | FEF6    | 03170 | ENGET                  | LBSR INCH      | 32B0 35 | 84   | 03420 | PULS                   | PC,B    |
|           |         | 03175 | *END OF ENTRY          |                |         |      | 03425 | *TABLE OF VALID INPUTS |         |
| 3278 81   | 0D      | 03180 | EN2                    | CMPA ##0D      | 32B2    | 41   | 03430 | CONV1                  | FCC /A/ |
| 327A 27   | 0E      | 03190 | BEQ                    | END1           | 32B3    | 04   | 03440 | FCB                    | \$04    |
|           |         | 03195 | *LOOK UP CHAR IN TABLE |                | 32B4    | 42   | 03450 | FCC                    | /B/     |
| 327C 6D   | 84      | 03200 | ENLP1                  | TST ,X         | 32B5    | 05   | 03460 | FCB                    | \$05    |
| 327E 1027 | FF26    | 03210 | LBEQ                   | ERROR          | 32B6    | 44   | 03470 | FCC                    | /D/     |
| 3282 A1   | 81      | 03220 | CMPA                   | ,X++           | 32B7    | 06   | 03480 | FCB                    | \$06    |
| 3284 26   | F6      | 03230 | BNE                    | ENLP1          | 32B8    | 48   | 03490 | FCC                    | /H/     |
| 3286 EB   | 1F      | 03240 | ADDB                   | -1,X           | 32B9    | 01   | 03500 | FCB                    | \$01    |
| 3288 20   | EB      | 03250 | BRA                    | ENGET          | 32BA    | 48   | 03510 | FCC                    | /H/     |
| 328A 30   | 8D 004D | 03260 | END1                   | LEAX CONV2,PCR | 32BB    | 01   | 03520 | FCB                    | \$01    |
| 328E 1F   | 98      | 03270 | TFR                    | B,A            | 32BC    | 48   | 03530 | FCC                    | /H/     |
| 3290 84   | 60      | 03280 | ANDA                   | ##60           | 32BD    | 01   | 03540 | FCB                    | \$01    |
| 3292 AA   | E4      | 03290 | ORA                    | ,S             | 32BE    | 48   | 03550 | FCC                    | /H/     |
| 3294 A7   | E4      | 03300 | STA                    | ,S             | 32BF    | 00   | 03560 | FCB                    | \$00    |
| 3296 C4   | 9F      | 03310 | ANDB                   | ##9F           | 32C0    | 2C   | 03570 | FCC                    | /,/     |
| 3298 6D   | 84      | 03320 | ENLP2                  | TST ,X         | 32C1    | 00   | 03580 | FCB                    | \$00    |
| 329A 1027 | FF0A    | 03330 | LBEQ                   | ERROR          | 32C2    | 2D   | 03590 | FCC                    | /-/     |
| 329E E1   | 81      | 03340 | CMPB                   | ,X++           | 32C3    | 09   | 03600 | FCB                    | \$09    |

## M & S \* SOFTWARE SAVES YOU MONEY!

ORDER NOW AND SAVE 10% ON AN ORDER OF TWO PROGRAMS  
 ORDER THREE PROGRAMS AND SAVE 15% OFF THE TOTAL

### THE DOT PAINTER®

is an easy way to High Resolution. Draw dot-by-dot lines by holding down two keys (Erase the same way)

on tape or disk for \$19.95!

(same easy price)

32k ext.

NEW - Dan Mickie's DOT-PAINTER **NEW**



Use your Lasers or Space Torpedoes to destroy the MERZOID enemy, but don't forget to set your shields or repairs damage. Lose computer control and drift into a Black-Hole or Star Life Support, Warp Drive, Other Options

Best TREK Program ★ Oct. 82 RAINBOW

**STAR PILOT** 16 or 32K ONLY \$19.95

TAPE - DISK

**M & S PAYS SHIPPING**

Visit The DUNGEON MAZE. Save The PRINCESS. Can You Escape Alive? Only By Using Certain Magic Items Found In The Maze!

See Review In Nov. 82 RAINBOW  
**NEW MAZE!**

Requires 32K EXTENDED \$24.95



WATCH FOR OUR SOON-TO-BE-RELEASED ALL-DISK HI-GRAPHIC SPY-ADVENTURE

EDITOR, 22 FUNCTION TEXT-PROCESSOR \$14.95

Would you like us to sell YOUR program? We will - do it on a royalty or consignment basis

LOOKING for a certain type program? Let Us Know.

**ORDER NOW!**

Personalized Checks Accepted With NO Waiting Period

**M & S Software**  
 No.1 Sunset Drive Lodi, OH 44254



|      |      |       |                             |        |         |       |              |                              |        |
|------|------|-------|-----------------------------|--------|---------|-------|--------------|------------------------------|--------|
| 32C4 | 2D   | 03610 | FCC                         | /-/    | 32DF    | 1288  | 03870        | FDB                          | \$1288 |
| 32C5 | 01   | 03620 | FCB                         | \$01   | 32E1    | 1389  | 03880        | FDB                          | \$1389 |
| 32C6 | 53   | 03630 | FCC                         | /S/    | 32E3    | 1486  | 03890        | FDB                          | \$1486 |
| 32C7 | 70   | 03640 | FCB                         | \$70   | 32E5    | 1585  | 03900        | FDB                          | \$1585 |
| 32C8 | 59   | 03650 | FCC                         | /Y/    | 32E7    | 1688  | 03910        | FDB                          | \$1688 |
| 32C9 | 30   | 03660 | FCB                         | \$30   | 32E9    | 1780  | 03920        | FDB                          | \$1780 |
| 32CA | 55   | 03680 | FCC                         | /U/    | 32EB    | 1881  | 03930        | FDB                          | \$1881 |
| 32CB | 50   | 03690 | FCB                         | \$50   | 32ED    | 1982  | 03940        | FDB                          | \$1982 |
| 32CC | 58   | 03700 | FCC                         | /X/    | 32EF    | 1A83  | 03950        | FDB                          | \$1A83 |
| 32CD | 10   | 03710 | FCB                         | \$10   | 32F1    | 028C  | 03960        | FDB                          | \$028C |
| 32CE | 28   | 03720 | FCC                         | /+ /   | 32F3    | 038D  | 03970        | FDB                          | \$038D |
| 32CF | 07   | 03730 | FCB                         | \$07   | 32F5    | 039F  | 03980        | FDB                          | \$039F |
| 32D0 | 20   | 03740 | FCC                         | /+ /   | 32F7    | 00    | 03990        | FCB                          | \$00   |
| 32D1 | 01   | 03750 | FCB                         | \$01   |         |       | 03995        | *RETURNS FOR FUTURE ROUTINES |        |
| 32D2 | 50   | 03760 | FCC                         | /P/    | 32F8 39 |       | 04000        | BKPT                         | RTS    |
| 32D3 | 80   | 03770 | FCB                         | \$80   | 32F9 39 |       | 04010        | CALL                         | RTS    |
| 32D4 | 43   | 03780 | FCC                         | /C/    | 32FA 39 |       | 04020        | DISK                         | RTS    |
| 32D5 | 00   | 03790 | FCB                         | \$00   | 32FB 39 |       | 04030        | GO                           | RTS    |
| 32D6 | 52   | 03800 | FCC                         | /R/    | 32FC 39 |       | 04040        | LOAD                         | RTS    |
| 32D7 | 00   | 03810 | FCB                         | \$00   | 32FD 39 |       | 04050        | PRINT                        | RTS    |
| 32D8 | 5D   | 03820 | FCC                         | /I/    | 32FE 39 |       | 04060        | PUNCH                        | RTS    |
| 32D9 | 00   | 03830 | FCB                         | \$00   | 32FF 39 |       | 04070        | REG                          | RTS    |
| 32DA | FF   | 03840 | FCB                         | \$FF   | 3300 39 |       | 04080        | STLEV                        | RTS    |
|      |      | 03845 | *CONVERSION TO SET POSTBYTE |        | 3301 39 |       | 04090        | TRACE                        | RTS    |
| 32DB | 1084 | 03850 | CONV2                       | FDB    | \$1084  |       | 04100        | VER                          | RTS    |
| 32DD | 1100 | 03860 | FDB                         | \$1100 |         |       | 04110        |                              | END    |
|      |      |       |                             |        |         | 0000  |              |                              |        |
|      |      |       |                             |        |         | 00000 | TOTAL ERRORS |                              |        |

all-in-one

# Swivel Organizer

"the perfect solution"

- ★ No more fumbling
- ★ Ends tangled cables
- ★ Everything you need is at your fingertips
- ★ Unique swivel base

**NO ONE can match these features and Beat Our Prices!**

- Woodgrain FORMICA FINISH (water and stain resistant)
- Swivel base allows sharing of computer Great for game playing and multi-use work stations
- Storage areas with clamps in rear for dressing cables neatly
- Cut out side allows ROM PACK insertion
- Comes fully assembled

**PLUS Swivel Base Model Available \$24.95 for Terminal Use**



another quality product from

**Shauntronics**

Send check or money order to:

Shauntronics • P.O. Box 131 • Fairview, N.J. 07022

**"ALL-IN-ONE" \$34.95**  
**SWIVEL BASE ONLY \$24.95**

SHIP TO:

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ Zip \_\_\_\_\_ Phone \_\_\_\_\_

\*Within Continental U.S.A.

add \$5.75 each for Shipping & Handling  
New Jersey residents add 6% sales tax

**Allow 4 to 6 weeks delivery**

## A Tale of Three Flexes

By Dr. Laurence D. Preble

All in favor of more powerful software for the Color Computer say Aye! Good . . . Now, someone explain to the Russian ambassador that rumble he heard was not a nuclear test—only the unanimous agreement of a megaton of CoCo users.

If you have been following my periodic reviews, you know that Flex (TM of Technical Systems Consultants) is a powerful alternative disk operating system for the Color Computer. An incredible variety of business software is designed to run under Flex. A number of programming languages are available including Pascal, Fortran, RS BASIC, RS Assembler, TSC BASIC, TSC Assembler, Relocating Assembler, Macro Assembler, Mumps, Forth and "C." Another reason I use Flex with the Color Computer is that it allows me to run high performance disk drives as well as the standard Radio Shack drives. One drive I use can handle nearly a megabyte of storage; that translates to over 200 programs stored on one disk!

Data-Comp was the first to "have" Flex for the Color Computer about two years ago. Commercial distribution did not actually begin until 1982. Their current offering has evolved considerably since the early beginnings which required hardware adapters and much software modifica-

tion. Frank Hogg Labs began offering their commercial version in early 1982. This implementation was actually the first to run on an "almost" stock CoCo. I say almost because it still required the hardware addition of 64K chips as do all current versions of Flex. Brand new is the offering by Spectral Associates. If each version of Flex were totally identical with its companions, it would not matter much where you purchase Flex. Life is rarely that simple. Technical Systems Consultants (TSC) authored the original versions of Flex; those versions, however, will not run on the Color Computer without modification. It is the modifications to Flex that are unique to each distributor.

Modifications to Flex consist of special input/output routines, video display implementations, printer drivers and disk drivers. Methods of installing Flex in the CoCo vary as well. In addition, each distributor has provided certain added attractions which we will discuss in some detail.

### Data-Comp Flex

Data-Comp does not actually sell a fully modified version of Flex—what they do sell is the F-MATE(RS) conversion for TSC Flex. The user, however, may purchase both the F-MATE(RS) conversion and TSC General version of Flex from the people at Data-Comp; it is then, a relatively simple procedure to combine the conversion package with Flex to have a working system. Once a "boot up" disk has been created, you can enter Flex from Radio Shack Disk BASIC by typing RUN "FLEX."

Once you have entered Flex, you may select a high resolution video display; you are no longer limited to the standard Radio Shack 32 column by 16 row screen format. A 51 x 24 display format is most useful; it provides good legibility on most TVs while giving you the added features of upper and lower case characters and an XY addressable cursor. Inverse video is also available. One very nice extra is that Data-Comp provides you with the Assembly Language Source listings of the video routines so that you may modify them at will. You may create screen formats of 32 x 16, 32 x 24, 42 x 24, 51 x 24 and 64 x 24. (Data-Comp also provides Source Code for a total of eight of its support commands, a freebie not currently available from other companies.)

Another salient feature of Data-Comp Flex is its NEW-DISK command. NEWDISK allows you to format a new disk any way you like within the physical limitations of the disk drive you are using. You may specify double or single sided, double or single density and you may specify the maximum number of tracks available. Up to this point, everything I have mentioned is also true of the other companies' NEWDISK commands; however, Data-Comp's NEWDISK also provides you with a running commentary on how the formatting is proceeding. Formatting a megabyte disk on a high performance drive takes several minutes and may lead you to believe your system has "hung" or crashed; so it is very nice to visualize the progress being made.

Although it is fine to use a Radio Shack disk drive with Flex, the formats of a Flex diskette and a Radio Shack diskette are dissimilar and therefore incompatible; however, Data-Comp provides three utilities for exchange of information between Radio Shack and Flex diskettes. RSREAD is a machine language command which will read a file from a Radio Shack disk and transfer the information to a Flex disk. This function is provided free. RSDIR is a machine language command which displays the directory of a Radio Shack disk—also free. Frank Hogg Labs does provide a command which includes the functions of RSREAD and

### NEW FOR THE COLOR COMPUTER

## GRAF PLOT

### HIGH RESOLUTION DATA GRAPHING

GRAF PLOT turns your COLOR COMPUTER into a sophisticated data plotter, producing professional quality graphs of any type of X-Y data. GRAF PLOT is perfect for personal, business, statistical, scientific and engineering applications. Includes features not found in any other COLOR COMPUTER graphing system:

- 222x174 pixel on-screen data plotting area.
- Complete on-screen labeling for two Y-axes w/200 data points per axis (even more points by chaining data files).
- 9 graphing options: 3 symbols w/2 line types or points only.
- Full function data editing: add, change, delete and sort.
- Hardcopy w/standard screenprint programs (not supplied) - includes interface for Tandy SCRPRT w/instructions for interfacing other printers and screenprint programs.
- Unlimited overlays - plot 9 or more data sets per graph.
- Graphs output to screen, printer, tape or disk.
- Plots any user-defined function, edit 4 program lines.
- Built-in data smoothing (moving binomial average).
- Built-in integration - calculate areas or evaluate integrals of user-defined functions.
- Lists data and integrals to screen or printer.
- Saves completed graphs for instant reloading.
- Menu-driven w/auto-prompt option for fast throughput.
- Complete error trapping - GRAF PLOT won't let you make a mistake, practically impossible to crash.
- Comprehensive manual w/tutorials and sample data.

GRAF PLOT is available for 16K E.C.B. on cassette (\$35) and 32K-1 disk (\$45). Easy upgrade to disk for difference in price (disk version reads and writes tape data files). Send check or money order to: HAWKES RESEARCH SERVICES, 1442 Sixth St., Berkeley, CA, 94710. Include \$3 S/H on all orders. Manual available separately for \$10+S/H, refundable with purchase of GRAF PLOT. CA residents add state sales tax. Dealer inquiries welcome. Quantity discounts available.



RSDIR but Hogg's version is written in DBASIC which you must purchase separately. Spectral Associates does not currently provide a similar function. RSWRITE is a machine language command which will write a Flex file to a Radio Shack disk. Currently, neither Frank Hogg Labs nor Spectral Associates offers such a function. Finally, RSCVBIN is a machine language command which will *rearrange* the format of a Radio Shack machine language program so that it will run under Flex. No other company currently offers this function.

Also provided free is CCBASIC, a conversion for Radio Shack Extended BASIC to run under Flex. The conversion allows you to *LOAD* and *SAVE* both BASIC and machine language programs in Flex format. Special disk input/output routines such as individual sector read/write functions are not implemented.

Data-Comp provides an unusual printer driver command that checks to see if the printer is ready before outputting data. Without such a feature, your system will "hang up" and need to be reset if you attempt to send data to the printer port with no printer available.

MEMEX and DISKEX are two more interesting machine language commands which allow the user to examine and change memory or the sectors of a disk respectively.

DISKRATE allows the user to set the stepping rate of a DISK drive. This is useful because some high performance drives can step up to five times faster than normal Radio Shack drives.

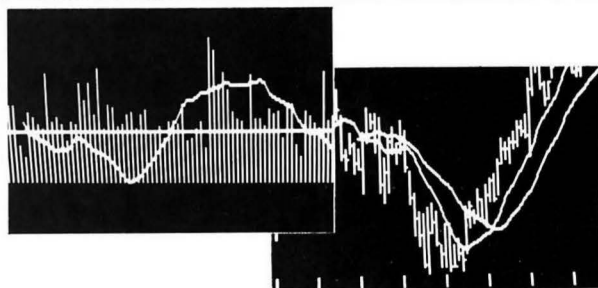
USERKEYS provides a means of defining your own control codes and special characters not available on the normal Color Computer keyboard.

When you buy the Flex package from Data-Comp, they also include a full feature Editor and Assembler from TSC. This is not exactly a freebie, however, because Data-Comp's price for their Flex package is higher than either the Frank Hogg Laboratories or the Spectral Associates version.

For those of you who wish to purchase or already own a separate terminal, Data-Comp sells a handy utility called TERM. For \$19.95 you receive a package that allows another terminal to access the Color Computer. An interesting feature is the recognition of the BREAK key on the terminal. While using EXT and receiving output from the computer, you may press BREAK on the terminal which will cause the output to pause. You may then press ESC to continue output or press a carriage return to abort output. One truly unique feature of TERM is the automatic recognition of baud rates from the terminal.

Overall, I was impressed with Data-Comp's version of Flex. There were a few aspects I felt were lacking or could stand some improvement. One example which really stands out is that the people at Data-Comp never purchased a license for Flex from TSC. Both Frank Hogg Labs and Spectral Associates purchased the rights to distribute Flex at a cost of from \$12,000 to \$20,000. A license to Flex allows the distributor to freely modify the operating system and to distribute the end result at whatever price they choose. By not purchasing a license to Flex, Data-Comp must sell their package of modifications separate from Flex and devise a method for the user to combine the modifications with the Flex package. This is not so bad but does add an extra step to setting up Flex. To reiterate, anybody, including you or I, can sell TSC Flex; of course, TSC will receive most of the

MTS **MARKET CHARTER**  
 MTS **LOG**  
 MTS **DATA NETWORK**



PROFESSIONAL LEVEL INVESTMENT TOOLS NOW AVAILABLE FOR THE COLOR COMPUTER. POWERFUL TECHNICAL ANALYSIS FUNCTIONS INCLUDING MULTIPLE VARIABLE MOVING AVERAGES, RATE OF CHANGE, OSCILLATORS, ETC. PLUS AUTOMATIC DAILY UPDATING OF PRICE AND VOLUME FILES VIA MODEM UTILIZING LOCAL AREA PHONE NUMBERS.

**SYSTEM** COLOR COMPUTER 32K\*  
**REQUIREMENTS:** 1 DISK DRIVE  
 PRINTER (Optional)  
 HAYES SMARTMODEM  
 (Required For Auto Price Updating)

**PRICE:** MTS MARKET CHARTER—\$95.00  
 MTS LOG & DATA NETWORK—\$25.00 Per Month  
 PRODUCT MANUAL—\$25.00 If Purchased Separately

Send Order Or Inquiry To:



**MTS**  
**Market Timing Software, Inc.**  
 6912 N. Sheridan Rd.  
 Chicago, IL 60626

\*ALSO AVAILABLE FOR TRS 80 MOD III, II, 12 AND 16; IBM-PC, APPLE II PLUS, ETC.

profit unless we agree to pay X amount of dollars to license the product. Once we obtain the license, we owe TSC nothing more and can modify and distribute Flex at will.

Without a license, the problem is that the price of Flex is set by TSC. Theoretically at least, both Spectral Associates and Frank Hogg Labs could cut prices on their versions of Flex as low as they like because the *own* the rights to Flex and pay no further royalties on each sale. In practice, however, the prices of the three Flex versions are fairly competitive.

### Frank Hogg Labs Flex

Frank Hogg Labs has been supplying Flex for the Color Computer for over a year now but has been supplying business software to run under Flex since 1979, long before the Color Computer was invented. The FHL version of Flex is well done. Installation of Flex is very simple because you do not need to do any procedures to modify Flex. Insert the system disk provided into drive 0 and type RUN "FLEX."

FHL Flex also provides several high resolution screens such as 32 x 24, 51 x 24, 64 x 24 and even 64 x 32. Again, I find the 51 x 24 screen most useful in all versions of Flex as it provides the best compromise between legibility and density of information. The FHL video formats provide all of the expected features plus a few unique features. Like Data-Comp and Spectral Associates, FHL gives you an addressable cursor, upper and lower case, control codes and inverse video. Extra functions include an optional status bar at the bottom or top of the screen like the fancy professional terminals. It is also possible to "protect" certain portions of the screen. That is, you can put a block of information on the screen and keep it from scrolling or being overwritten. FHL

video routines also allow special methods of generating *all* of the ASCII characters and codes without the necessity of defining user keys.

A very handy feature of FHL Flex is the HELP command. Did you forget how to work a certain command like CAT? Type HELP CAT to get the answer. No other version of Flex currently offers this feature.

FHL also provides a printer driver that is built into Flex. That means the driver is immediately available without loading from disk. You can even send a special control code from the keyboard to cause everything that outputs to the screen to also output to the printer. This is especially useful for getting hard copies from programs that were not designed to access the printer port. Baud rates up to 9600 are provided.

The SETUP command is very powerful. You may use SETUP to alter the printer baud rates, set up parameters for an external terminal, set up stepping rates for your disk drives and examine and change portions of memory. You can even use the SETUP command to tell the operating system what kind of disks you have; once the system is informed that you have a 40 track single sided drive, it would not waste time trying to format that drive 80 track or double sided. FHL's competitors at Data-Comp seem to feel that this aspect of SETUP is a waste of time and an extra step. On other Flex systems, if you attempt to operate a disk drive beyond its capacity it will flop around for a while but eventually give up. On FHL Flex the system immediately knows if you try to overextend a drive's capability and aborts gracefully. Is the extra step of using SETUP worthwhile? Well, before deciding, remember that this only need be done once and then forgotten. The other mentioned functions of SETUP are undisputably worthwhile.

For those who own or intend to buy a professional dumb terminal, a useful set of commands is EXT and INT. Like Data-Comp's TERM command, EXT gives control of the computer to an external terminal which would normally include a professional full function keyboard and an 80 x 24 character display. INT restores control to the Color Computer's internal keyboard. As with Data-Comp's TERM command, the BREAK key is recognized to cause a pause in the output stream. Unlike Data-Comp's TERM command, baud rates to the terminal are initialized with the SETUP command. Also unlike Data-Comp's TERM command, EXT and INT are included in the purchase price of FHL Flex.

Some of you may be interested in learning Assembly Language and may need some editing capability but are not willing to spend a hundred bucks for the software. Frank Hogg Labs recently began including an Interactive Assembler and a Tiny Editor free when you purchase their version of Flex for \$69.95. I know that Data-Comp includes a full feature Assembler and Editor with their Flex. The catch is that Data-Comp charges \$199 for their basic Flex package. Neither the Interactive Assembler (ISM) nor the Tiny Editor (TED) are as powerful as their grownup counterparts but they are surprisingly capable for their size. ISM assembles code directly to memory and can immediately execute the code, hence the term "Interactive." Also included is the ability to examine and change memory. TED is line oriented and allows global searches and changes.

So far, everything I have described is included when you buy FHL Flex for \$69.95. For an extra \$30, you can buy DBASIC which I feel is well worth the expense. DBASIC is FHL's conversion of Radio Shack's Disk Extended BASIC.

**KALEIDOSCOPIIC CREATIONS  
PRESENTS**

# **SCRAMBLE®**

**AN AMAZING NEW WORD GAME**

**FOR 2 TO 4 PLAYERS THAT**

**CHALLENGES THE INTELLECT.**

**WILL YOU HAVE THE "SMARTS"**

**TO UNSCRAMBLE THE MESS?**

**FOUR DIFFICULTY LEVELS.**

**FUN FOR ALL AGES.**

**GREAT AT PARTIES.**

**16K NON-EXT. TAPE**

**SEND \$15.95 (DELIVERY INCL.) TO**

**KALEIDOSCOPIIC CREATIONS  
P.O. BOX 1284  
MELROSE PARK, IL 60160**



**FOR THE TRS 80 COLOR COMPUTER**



# MIND BOGGLING ADVENTURES



## BEACON

by PAL Creations

You are the new keeper of an old lighthouse. The fact you have no experience doesn't matter as the old keeper will meet you there to show you the ropes.  
32K EXT..... \$14.95

## MANSION OF DOOM

by PAL Creations

Rescue the Princess Marlena from the mysterious Count Von Steinoff and reunite her with the townspeople of her village in Transylvania. The Count's mansion has 76 distinct locations for you to explore in your rescue attempt.  
32K EXT..... \$14.95

## STALAG & ENO

by PAL Creations

1) You are an allied POW in a German prison camp in 1944 and were forgotten in the hot box when the camp was evacuated due to unexpected bombing raids. How will you get out ALIVE?

2) Your eccentric old aunt just died and left you a fortune in cash. To prove you deserve it, you must decipher the clues and find your fortune, which she hid in her living room.

32K EXT..... Both for \$14.95



OLDIES BUT GOODIES...

## JUNGLE TREK

Lost in a jungle with wild animals lurking; your only survival is to find a safe compound before you are lunch for lions; high resolution; multi-color.

16K EXT..... \$14.95

## SCORE-EZ

From 1 to 6 people can play this excellent adaptation of a popular board game. The computer keeps score for all players, and rolls dice. You can roll again just like the original game. Properly position the results of each turn for maximum score. The only thing you will need besides your computer is players. Color graphics and sound will entertain you for hours, and it's EZ to play.

16K EXT..... \$15.95



## BIORHYTHM/PSYCHIC APT.

1) Prints biorhythm charts of nearly unlimited length; attractively formatted for use on Line Printer VII. 16K

2) Your psychic ability is determined through questions evaluating your psychic experiences

16K Ext..... Both for \$15.95



## EVASION

by PAL Creations

You have just escaped from a German prison camp. That was the easy part. Now you must get out of Germany!

32K EXT..... \$19.95

## TOWER CASTLE

from Moreton Bay

..... \$17.95

## BLACK SANCTUM

by Mark Data

..... \$19.95

## EL DIABLERO

by Computerware

..... \$19.95

## CALIXTO ISLAND

by Mark Data

..... \$19.95

## JARB<sup>INC</sup> SOFTWARE HARDWARE

COMPUTER PRODUCTS  
1636 D Avenue, Suite C  
National City, CA 92050  
(619) 474-6213

Dealer/Author Inquiries Invited

All programs warranted 60 days from date of purchase to original purchaser. Unless otherwise specified, shipping and handling \$2.00 per order. California residents add 6% sales tax.

U.S FUNDS ONLY

C.O.D. ORDERS ACCEPTED

NO CREDIT CARD ORDERS



## CARIBBEAN ODYSSEY

You are stranded on a Caribbean island once used by pirates to store their treasures. While searching over 70 distinct locations, can you find your one chance for rescue?

32K EXT..... \$19.95



## THE FINAL COUNTDOWN

by Bill & Debbie Cook

You are outside a missile base which has just been evacuated because a beserk General has started the countdown on a nuclear missile - target: MOSCOW. Your mission, if you accept it, is to stop the missile launch and prevent WWII.

16K EXT..... \$14.95

## S.S. POSEIDON

by Bill & Debbie Cook

You are aboard the S.S. Poseidon when it is capsized by a tidal wave. It is floating bottom-up on the surface and taking on water. Will you survive to tell your tale?

16K EXT..... \$14.95

## SANDS OF EGYPT

DISK..... \$29.95

## UTILITIES

Disk to Tape (Tom Mix)..... 19.95

Tape to Disk (Tom Mix)..... 19.95

Color Diagnostic (Computerware)..... 17.95

Programmers Toolkit (Moreton Bay)..... 28.95

GNT (Graphics 'n Text)..... 19.95

## ARCADE ACTION!!!

From Computerware: Pac Attack II, Doodle Bug, Shark Treasure..... 24.95  
Megapede, Rail Runner..... 21.95  
Synther 7 Music Synthesizer..... 24.95

From Intracolor: Colorpede..... 29.95 Robottack ..... 24.95  
The King, Katerpillar..... 24.95

From Tom Mix: Protectors, Moonlander..... 15.95  
Bird Attack..... 21.95 Solo Pool..... 17.95  
Space Shuttle ..... 28.95

From Spectral Associates: Galax Attax..... 21.95  
Planet Invasion..... 24.95  
Ghost Gobbler..... 24.95

## FOR SERIOUS APPLICATIONS:

Telewriter - 64 (Cognitech)..... 49.95 Cass. 59.95 Disk.  
Mailing List (Tom Mix)..... 19.95 Disk  
Coco Writer (Moreton Bay)..... 34.95  
File Cabinet (Moreton Bay)..... 29.95  
Report (Moreton Bay)..... 24.95

## ATTENTION AUTHORS

Excellent Royalties

ALL SUBMISSIONS EVALUATED  
Send S.A.S.E.

Nearly all the disk commands have been adapted to work with Flex. Implemented disk commands include FREE, DRIVE, VERIFY, LOC, LOF, DSKI\$, DSKO\$, OPEN and CLOSE. Only random files have not been implemented. Nearly all of my disk oriented RS BASIC programs will now run under DBASIC. This is different from Data-Comp's CCBASIC which will allow you to *LOAD* and *SAVE* programs in Flex but does not implement the other disk I/O commands. Of course, you must pay extra for DBASIC while CCBASIC is included in Data-Comp's basic Flex package.

I am happy with most features of FHL Flex. Like most of man's endeavors, there is room for improvement. Of the three Flex implementations tested, FHL had the slowest video display. Balance this statement with the knowledge that FHL's video display offered the most features. No Source Code was provided with the FHL utilities. This is unfortunate for the hackers like myself who are always tinkering and modifying their systems.

FHL copy protects their programs that puts the bootstrap loader (PUTBOOT) on a disk. A bootstrap loader is the program that gets you from Radio Shack Disk BASIC into Flex. Copy protection of the loader prevents the user from making illicit copies to distribute to friends. Unfortunately, it also prevents the user from making a backup copy of the bootstrap program for himself. This is not exactly terrible since the program which puts the bootstrap loader on a disk need only be used once. If PUTBOOT is ever destroyed FHL will send you another copy at a nominal fee. But this could be inconvenient. Understand that only the PUTBOOT command is protected—everything else that comes

with FHL Flex may be copied for your personal use. Neither Data-Comp nor Spectral Associates protects their bootstrap loader.

### Spectral Associates Flex

Spectral Associates is the newest company to offer Flex but their effort is of high quality. Actually, Spectral Associates offers two versions of Flex, *Flexplus* for \$69.95 and *Flexplus with Supercharger* for \$89.95. The essential difference is that the addition of the Supercharger allows interrupt driven software to work without modification. For you technical types, the Supercharger moves the interrupt vectors out of ROM into high RAM. The Supercharger itself is a small printed circuit board which plugs directly into CoCo's expansion slot. The disk drives then plug into the Supercharger. One immediate advantage is the printer spooling capability provided with Supercharger Flex. Printer spooling is a form of multitasking or timesharing. The contents of a disk file are dumped to a printer as a background task. Simultaneously, you can use the computer for any other task such as editing, assembling, or TSC BASIC. Printer spooling also allows you to make multiple copies of any file or to output multiple files to the line printer. Anytime you wish to check on the progress of the printing, the QCHECK command will give you an update.

Installation of Flex+ is easy. Just insert the system disk provided and type RUN "FLEX+." Like Frank Hogg Labs, Spectral Associates has licensed the rights to Flex.

An outstanding feature of Spectral Associates' Flex (SAF) is the video display. The SAF video display was the fastest of the three tested. The HIRES video display was also the easiest to read with the color on my TV turned on. SAF's black on green format is more legible than FHL's and Data-Comp's black on white. I tried this on several TVs to make certain this was not an anomaly. However, if you are willing to turn off the color on your TV, all three companies' video formats are quite legible. Another interesting feature is that SAF's video formats are memory resident. You can instantly change from LORES to HIRES without waiting for disk I/O. Perhaps the most amazing fact is that none of SAF's video routines steal user memory. The entire bottom 48K is available for user applications. In both FHL and Data-Comp Flex, some user memory is required for the high resolution screens. SAF's video routines also allow addressable cursor and can generate control codes and special characters from the keyboard. SAF only provides a 32 x 16 and a 51 x 24 screen format, however. Since the 51 x 24 format is the most useful, I feel that most users will not miss the other high resolution formats.

SAF provides a selection of printer drivers. One driver optimizes the output for the Epson printer. Another driver optimizes the output for the Lineprinter VII. Baud rates are offered up to 9600 by careful timing sequences built into the drivers. All TTYSET parameters are honored.

One of SAF's most powerful commands is DUPO. For those of you who only own one disk, DUPO offers incredible control over making single disk copies. Individual files may be copied, the entire disk may be copied, or the directory will be scanned and the user will indicate which files to copy. This is a great enhancement over the single disk copy (SDC) commands offered by both FHL and Data-Comp. Other single disk copy commands require the user to specify each file individually.

MON is another memory resident command. (It is memory resident in the area where the HIRES screen resides and is available so long as you do not use the HIRES



You were out on test maneuvers in the new exploration vehicle when a swarm of traglons attacked. You must reach the next Moon Base! Your Moon Hopper can roll over the surface with its tank-like tractors, hop over any obstacle (cravasses, craters, rocks) and is equipped with the latest phaser equipment forward & atop to incinerate any attackers. You'll need those phasers to fend off the enemy aliens!

cassette \$24<sup>95</sup>      disk \$29<sup>95</sup>      add \$2<sup>00</sup> shipping

**COMPUTERWARE**  RAINBOW CERTIFICATION

Box 668 • Encinitas, CA 92024

Dealer Inquiries Invited (619) 436-3512



function). MON allows you to examine and change memory and jump to various execution points. I don't know how Spectral Associates managed to pack this and all the video routines into memory, but they did!

SAF offers another unique command, PLAY. PLAY loads and executes a machine language program which requires Radio Shack BASIC. As an example, SAF has included a version of *Space Invaders* on their system disk which works very nicely with the PLAY command.

SAF does not currently offer anything approaching the utility of FHL's DBASIC or even Data-Comp's CCBASIC. They do, however, offer PBASIC which will copy Color and Extended BASIC into RAM. No disk functions have been implemented with PBASIC. Once in PBASIC, you may return to Flex by typing EXEC &HCD00. The folks at Spectral Associates are reportedly working on a program like FHL's DBASIC. I'm sure they will keep you posted.

Spectral Associates' NEWDISK command has a unique feature. Whenever you format a disk, NEWDISK automatically puts a bootstrap loader onto a few sectors. (FHL and Data-Comp think this is a waste of space. I think the convenience outweighs the loss of a few sectors.) A bootstrap loader is the program that gets you from Radio Shack Disk BASIC into Flex. Both FHL and Data-Comp require you to use a special procedure to place a bootstrap loader onto a disk.

One fault I find in SAF is the way disk seek rates are adjusted. In both FHL and Data-Comp Flex it is possible to permanently set the disk drive seek rates. SAF, however, tries to operate your drives at the fastest rate possible. If a read error occurs, the next fastest seek rate is used and so on

until a solid read occurs. At first glance, this may seem like a good idea. After all, this is one way of automatically determining the capability of your drives. The trouble is that if *any* type of read error is ever encountered the seek rates go down and *stay* down. This is true even if you have the fastest drives possible. This does not hurt anything, only an inconvenience. Of course, if you have standard drives or if your fast drives never make a mistake, then this is no problem. I understand that Spectral Associates is planning to go to a manually adjustable seek rate in their next release of Flex+.

A representative at Spectral Associates has informed me that an expanded set of utilities will be available for purchase with Flex in the next few weeks; unfortunately, their package did not arrive in time to be included in this review. Spectral Associates has done a remarkable job so far, especially when you consider the newness of their Flex product.

#### Summation

All three companies were very helpful in explaining products over the phone—even before I identified myself as a reviewer for *the Rainbow* magazine.

Remember, all versions of Flex require 64K in your Color Computer. If your CoCo has less than 64K, upgrading can be accomplished with relatively little expense. All three companies provide instructions for the installation of 64K chips. Some CoCos and TDP 100s may need no upgrade at all. The new machines which came with 32K of RAM may actually have 64K available. Again, check with one of the Flex distributors.

I have found all three versions of Flex to work as advertised. There are considerable differences in the "extras" offered, however. Bear in mind that many of the extra or

# COMPUKIDS MAGAZINE

## The Computer Magazine for Beginners

Educational articles that are easy to understand  
Game programs  
Computer book reviews  
Program problems

## CompuKids Club

1 year magazine subscription  
Contests with GREAT prizes  
Free computer advice  
Program exchange  
Educational programs  
... and lots more ...

- One year subscription *plus* one year membership in CompuKids Club — \$24.00  
(Canada — \$31.00)
- One year subscription only — \$16.00 (Canada — \$20.00)
- Six month trial subscription — \$9.00 (Canada — \$11.00)
- Payment enclosed (check or money order)
- Please bill me later (a \$1.00 billing fee will be added)

(Special School and Group Rates Available)

Name \_\_\_\_\_ Age \_\_\_\_\_ Signature if billing \_\_\_\_\_

Address \_\_\_\_\_ City \_\_\_\_\_ State \_\_\_\_\_

Zip Code \_\_\_\_\_ Phone \_\_\_\_\_

Mail Check or Money Order to:

CompuKids Magazine RB  
P.O. Box 874  
Sedalia, MO 65301

Or Phone TOLL FREE:  
1-800-822-KIDS

unique utilities from one company's Flex will work just fine on another version of Flex. Exceptions to this rule are the utilities which access undocumented portions of Flex and its disk drivers. An example of this is Frank Hogg's DBASIC which will only work with Frank Hogg's Flex. This is not intentional but simply due to the nature of the modifications to Flex.

Another point to consider is the compatibility of disk formats. All three Flex implementations are compatible for exchange of software on single sided disks. Only Frank Hogg Labs and Spectral Associates have made their Flex compatible for exchange on double sided disks. This is not a problem, really, since nearly all software sold for use with any version of Flex is written on single sided media.

Pricing deserves some consideration. Spectral Associates offers non-supercharger Flex at \$69.95. The *Supercharger* version sells for \$89.95. However, an Editor and Assembler will cost you an extra \$25 apiece. FHL's Flex costs \$69.95 and includes a Tiny Editor (TED) and a small Interactive Assembler. Full Feature Editors and Assemblers are available for an extra \$69.95 as a package. I should point out that FHL's Editor and Assembler do offer a few more features than the TSC Editor and TSC Assembler sold by both Spectral Associates and Data-Comp. Data-Comp's Flex costs \$199 but includes a full feature TSC Editor and TSC Assembler.

Spectral Associates, however, offers a similar package deal for the lowest price of \$119.95. These are current April prices. I suspect that all three companies will strive to be competitive; so check *the Rainbow's* advertising sections before you decide.

## Where To Buy Flex

Data-Comp  
P.O. Box 794  
Hixon, TN 37343  
1 (615) 842-4601

Frank Hogg Laboratories  
The Regency Tower  
770 James Street  
Syracuse, NY 13203  
1 (315) 474-7856

Spectral Associates  
3418 South 90th  
Tacoma, WA 98409  
1 (800) 426-1830

## Author's Post Script 5/11/83

This review, written in April, was submitted for comment to the three Flex distributors. Some of their reactions and comments were interesting.

There were a couple of factual errors which were corrected in the body of this text. The reactions also indicated a highly competitive spirit—some were even amusing, like who should be listed first. Allow me to set aside any fears of prejudicial treatment; the three companies are listed alphabetically.

Here is another point of clarification. I feel that Data Comp's "unusual printer driver" is a *good* idea. I like the way it provides an option to get my printer on line if it is not already on line.

Another comment by Data-Comp suggested their version of Flex was somehow more "standard." I would like to point out that all three companies use the "standard" TSC Flex as a basis for their products. "Standard" Flex, however, will not run on a CoCo without the necessary modifications. Documented Flex entry points are not changed in any of the three companies' Flex releases. All companies provide the Flex advanced programmers manual. All companies will sell you "standard" TSC Editors, Assemblers and BASIC. Some companies, however, offer you alternative choices in Editors, Assemblers and BASIC. Data Comp, Frank Hogg Labs and Spectral Associates have done a fine job in keeping Flex as standard as possible.

All three distributors indicated that they were basically satisfied with the review. Of the three, Spectral Associates had the fewest bones to pick—only a pricing correction. Frank Hogg Labs sent us a four page single spaced letter which rivaled the amount of space received in the review! Obviously, I cannot print all of their comments; however, my overall impression from their comments is that all three companies will do whatever is necessary to remain competitive.

For example, Data-Comp has included even more utilities with their package. Their external terminal program is now included free of charge. A multiple column catalogue command is provided. A file search command is provided. Grand total of "free" utilities is now 24, 12 of which include Source Code.

Frank Hogg Labs has come out with Version 5.0:4 with some fine additional features, including "Smooth Scrolling," a speedup of the normal scrolling; an improvement in their external terminal package; and green display screen option. FHL has also lowered the base price to \$139.95.

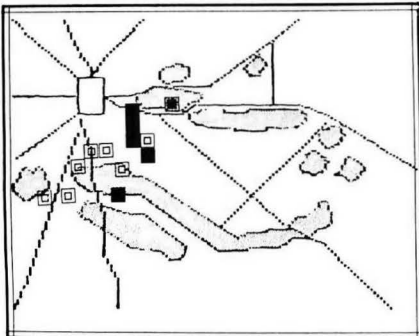
Spectral Associates has also made improvements in their offering. A nice utility package is available which includes functions that allow you to modify individual disk sectors and alphabetize the directory. Another utility allows you to produce a "map" of the sectors occupied by any of the files on a disk. Spectral Associates still has the lowest price of \$119.95 for non-supercharger Flex.

Gentlemen, I like your competitive spirit. I use all three of your Flex packages with satisfaction. My choice of package generally depends on the particular utility or unique function desired. Gentle readers, it is now up to you.

## BATTLE of GETTYSBURG A Strategy Game for mature Players

### STOP REBEL INVADERS OR DIE!

16K ext.  
joystick



cassette  
\$20.95



## SOFTWARE

P.O. Box 3504  
Austin, Texas: 78764  
(512)-444-6135





# DSL COMPUTER PRODUCTS

P.O. BOX 1113 - DEARBORN, MI 48121 - (313) 582-8930



**Michigan Residents Add 4% Sales Tax to Order  
Please include \$1.00 for S & H  
VISA & MASTERCARDS ACCEPTED**

## QUALITY SOFTWARE FOR THE COLOR AND TDP SYSTEM 100 COMPUTERS

### Specialty

The General a general ledger program holds 100 accounts with over 500 transactions per account 32K \$39.95

Calligrapher Great for designing custom posters, invitations flyers or name tags Two print fonts available Old English and Chancery for Line Printer VII use Disk ONLY \$14.95 each Please specify print font when ordering.

Color Bonanza 50 program package includes business, utilities, utilities as well as arcade fun. Less than \$1.00 per program! \$49.95

### Arcade Fun

|                                                |     |     |         |
|------------------------------------------------|-----|-----|---------|
| Packmaze                                       | ML  | 16K | \$16.95 |
| Bug Chase Ext.                                 | 32K |     | \$15.55 |
| One or two player or robot bug against turtle. |     |     |         |
| Donkey King                                    | 32K |     | \$24.95 |
| Moon Lander                                    | 16K |     | \$15.95 |
| Dancin' Devil                                  | 16K |     | \$14.95 |
| War Kings                                      | 16K |     | \$19.95 |
| Spider                                         | 16K |     | \$19.95 |
| Cave Hunter                                    | 16K |     | \$24.95 |
| Haywire                                        | 16K |     | \$24.95 |
| Astro Blast                                    | 16K |     | \$24.95 |

### Literature

|                                     |         |
|-------------------------------------|---------|
| Assembly Language Graphics          | \$14.95 |
| Basic Computer Programming for Kids | \$14.95 |
| TRS-80 Color Computer Graphics      | \$14.95 |

### NOW AVAILABLE

#### Nelson Software

|                      |    |         |
|----------------------|----|---------|
| Super Color Writer   | T. | \$49.95 |
| .....                | D. | \$99.95 |
| Super Color Terminal | T. | \$39.95 |
| .....                | D. | \$59.95 |

### INTRACOLOR COMMUNICATIONS

|             |     |    |    |         |
|-------------|-----|----|----|---------|
| Colorpede   | 16K | ML | T. | \$29.95 |
| Rototattack | 16K | ML | T. | \$24.95 |
| .....       |     |    | D. | \$27.95 |

### Educational

|                            |     |         |
|----------------------------|-----|---------|
| Speller                    | 16K | \$16.95 |
| Geo-Studies                | 16K | \$ 9.95 |
| USA, Canada, Europe, Aust. |     |         |
| Word Drill                 | 16K | \$19.95 |
| Math Drill                 | 16K | \$19.95 |

### Adventures

|                |     |    |         |
|----------------|-----|----|---------|
| Calixto Island | 16K | ML | \$19.95 |
| Black Sanctum  | 16K | ML | \$19.95 |

### Utilities

|           |     |    |            |
|-----------|-----|----|------------|
| Copy Cat  | 16K | ML | \$19.95    |
| Color DFT | 16K | ML | T. \$19.95 |
| .....     |     | D. | \$29.95    |

### Hardware

Grand Slam Solderless Kit ..... \$75.00  
For E or F Board and 1.1 Rom  
Please include \$10.00 REFUNDABLE tool deposit with order  
For All Boards  
Ram Slam Solderless Kit  
16-32K \$49.95  
15-minute installation  
**ONE YEAR WARRANTY**

# Expanding Your Character File Programs

By Bob Albrecht and George Firedrake  
*Rainbow* Contributing Editors

Millions of young people, and many not so young, are playing fantasy role playing games. A role playing game is a game in which one or more players create and control characters (adventurers) who live their imaginary lives in a specially made game world. The game world is created, managed, and operated by a GameMaster (GM), also called a referee, adventure master, or dungeon master (DM).

Most people who play role playing games use a formal rule system. Some of the best known are shown below.

**Dungeons & Dragons (D&D).** From TSR Hobbies, P.O. Box 756, Lake Geneva, WI 53147.

**RuneQuest (RQ).** From Chaosium, P.O. Box 6302, Albany, CA 94706.

**Tunnels & Trolls (T&T).** From Blade, Box 1467, Scottsdale, AZ 85252.

**Worlds of Wonder (WOW).** From Chaosium, P.O. Box 6302, Albany, CA 94706.

**BEGINNERS BEWARE!** The rule books are very difficult to understand. If you are a beginner, first try *Worlds of Wonder* or *Tunnels & Trolls*. Programs in "GameMaster's Apprentice" are based on the game system used in *Worlds of Wonder* and *RuneQuest*. For general information about fantasy role playing games, try the following book; it's excellent for beginners.

**Through Dungeons Deep** by Robert Plamondon. From Reston Publishing Company, 11400 Sunset Hills Road, Reston, VA 22090.

This book has good information related to **Dungeons & Dragons**

## The Character File

Yup, here is yet another character file program. It stores the names and seven basic characteristics for a fantasy role playing game character. The program is structured like this:

When you first run the program, it begins with the menu in lines 200 through 450. The menu lets you select one of the three options in the program. You may look up a record by name of character, scan the entire file, or return to the menu.

*(Bob Albrecht and George Firedrake are two of the most prolific authors in the microcomputer world today. Specialists in writing for beginners, they are authors of numerous books, including TRS-80 Color Basic.)*

The CHARACTER FINDER module is in lines 1000-1630. Use it to look up a character, using the name of the character as the search key. You can stay within this module or return to the menu.

The SCAN CHARACTER FILE module is in lines 2000-2430. Use it to scan the entire file, beginning with the first record. You can stay within this module or return to the menu.

Both modules use three subroutines, beginning at lines 10000, 11000, and 12000 respectively.

Both modules use a common *data base*, which begins at line 30000.

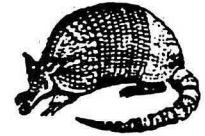
Let's look at the program a piece at a time. First the menu.

```
100 REM**CHARACTER FILE PROGRAM
200 REM**TELL HOW TO USE
210 CLS
220 PRINT "YOU CAN FIND A CHARACTER RECORD"
230 PRINT "BY NAME OF CHARACTER OR YOU CAN"
240 PRINT "SCAN THE ENTIRE CHARACTER FILE."
250 PRINT @128, "MENU:"
260 PRINT @194, "TO FIND A RECORD, PRESS '1'"
270 PRINT @226, "TO SCAN ENTIRE FILE, PRESS '2'"
280 PRINT @258, "TO RETURN TO MENU, PRESS '0'"
400 REM**WAIT FOR KEY
410 KEY$ = INKEY$
420 IF KEY$="" THEN 410
430 IF KEY$="1" THEN 1010
440 IF KEY$="2" THEN 2010
450 IF KEY$="0" THEN 210 ELSE 41
```

The menu accepts only the keys 1, 2, or 0. It will wait all day while you press other keys (except BREAK, of course). Do you see how another option, or several more, can be added to the menu? How would you change the menu program to use "F" to find a record, "S" to scan the entire file, and "M" to return to the menu?



# TRS-80C<sup>®</sup> and TDP 100<sup>®</sup> SPECIALISTS



## COLORFORTH<sup>®</sup>

**IS THERE LIFE AFTER BASIC?** Yes! with **COLORFORTH**, a new, high level language for the color computer. **COLORFORTH**, a figFORTH compiler, has an execution time as much as 10 to 20 times faster than Basic, and can be programmed faster than Basic. **COLORFORTH** is highly modular for easy testing and debugging. **COLORFORTH** has been specially customized for the color computer and requires only 16K. It **does not** require Extended Basic. When you purchase **COLORFORTH**, you receive both cassette and RS/DISK versions, the figEDITOR and an extensive instruction manual. Both versions and 75 page manual, all for only . . . . . \$ 49.95

## PCFORTH

FORTH for the IBM PC<sup>®</sup> and Zenith Z-100<sup>®</sup>. All the features of **COLORFORTH**, but customized for the IBM and Zenith Z-100 personal computers. Requires 32K and MS/DOS or IBM/PCDOS. On 5-1/4" SSDD diskette. Complete with 75 page manual, just . . . . . \$ 59.95

**NEW!**

## MASTER MIXOLOGIST<sup>®</sup> The Bartenders' Guide

This disk based program for the color computer contains recipes for over 150 of your favorite bar drinks—both alcoholic and non-alcoholic. **MASTER MIXOLOGIST** is menu driven for ease of use. Requires 16K and one RS/DOS drive. Get this one today, it will be great for your next party . . . . . \$ 19.95

## ARMADILLO BUG<sup>®</sup> MACHINE LANGUAGE MONITOR

More and more programs are appearing in magazines written in Machine Language. Now with **ARMADILLO BUG**, you can easily enter Machine Language programs without a lot of time consuming "pokes". **ARMADILLO BUG** is an excellent system for beginners to learn to write and debug their own Machine Language programs as well. This package includes: Memory examine and change; Move; Punch and Load; Fill commands; and more! Runs in 16K, and **DOES NOT** require Extended Basic. Complete on cassette with printed manual. Just . . . . . \$ 14.95

## COLOR BIORHYTHMS

This is a neat **BIORHYTHMS** program you can use to chart the future (or past). Includes High Resolution graphics **without** Extended Basic being required. Runs in 16K. On cassette, with instructions . . . \$ 10.95

## OTHER ITEMS OF INTEREST

"**STARTING FORTH**", a book by Leo Brodie. The best introductory Forth text available. 384 pages. Soft cover . . . . . \$ 16.00

figFORTH Installation Manual. Contains FORTH model, glossary, memory map, and instructions . . . . . \$ 15.00

figFORTH 6809 Source Listing. (NOTE: THIS IS NOT IDENTICAL TO COLORFORTH SOURCE). Requires installation manual for implementation . . . . . \$ 15.00

**BUY BOTH** at the same time and **SAVE!!** Both for . . . . . \$ 25.00

"**Computers Piss Me Off**". Wear the official programmers badge. Large 2-1/4" yellow button says it all! Post paid . . . . . \$ 1.50

"**I ♥ My Color Computer**". White button with black lettering and red heart. 2-1/4". Post paid, only . . . . . \$ 1.50

### DEALER and AUTHOR INQUIRES INVITED

Please add \$ 2.00 shipping in U.S.

Texas residents add 5 %

Foreign orders must be in U.S. funds drawn on U.S. banks, or Mastercard and VISA

## ARMADILLO INT'L SOFTWARE

P.O. BOX 7661  
AUSTIN, TEXAS 78712



PHONE (512)835-1088

If you press "1," you go to the CHARACTER FINDER module.

```
1000 REM**CHARACTER FINDER
1010 CLS
1020 INPUT "NAME OF CHARACTER";
WHO$
1030 RESTORE 'BEGINNING OF FILE

1200 REM**LOOK FOR WHO$
1210 GOSUB 11010 'GET A RECORD
1220 IF NAYM$=WHO$ THEN 1230 ELS
E 1410
1230 GOSUB 12010 'DISPLAY RECORD
1240 GOTO 1610

1400 REM**CHECK FOR EOF
1410 IF NAYM$="ENDFILE" THEN 142
0 ELSE 1210
1420 PRINT "I DON'T KNOW " WHO$

1600 REM**TELL HOW TO DO AGAIN
1610 GOSUB 10010 'GET REQUEST
1620 IF KEY$="" THEN 210 'MENU
1630 GOTO 1010
```

In lines 1030, 1210, 1230, 1610, and 1620 we include remarks following the apostrophe (') to help you understand what is happening. You don't have to enter this part of the line—explanatory comments are for people.

Lines 1210, 1230, and 1610 call on subroutines. These subroutines are also used by the SCAN CHARACTER

FILE module. Using subroutines this way gives us lots of flexibility. For example, we can change the structure of the file without having to rewrite the modules!

To get back to the menu, press the "0" key. This is handled in line 1620.

Suppose the menu is on screen and you press the "2" key. Presto, you arrive at the SCAN CHARACTER module.

```
2000 REM**SCAN CHARACTER FILE
2010 CLS
2020 RESTORE 'BEGINNING OF FILE

2200 REM**READ & DISPLAY RECORD
2210 GOSUB 11010 'READ A RECORD
2220 GOSUB 12010 'DISPLAY RECORD

2400 REM**TELL HOW TO DO AGAIN
2410 GOSUB 10010 'GET REQUEST
2420 IF KEY$="" THEN 210 'MENU
2430 IF NAYM$="ENDFILE" THEN 202
```

This module is short because most of the work is done by the subroutines beginning at lines 10000, 11000, and 12000. Line 2420 gets you back to the menu, if you should press the "0" key at the appropriate time.

The DO AGAIN SUBROUTINE provides some information, then waits for you to press either the space bar or the "0" key.

```
10000 REM**DO AGAIN SUBROUTINE
10010 PRINT
10020 PRINT "TO DO AGAIN, PRESS
SPACE"
```

## FOR YOUR COMPUTATION.

**SECRET CODES** \$9.95 4K. Makes encoding and decoding secret messages easy.

**ENEMY SEARCH** \$9.95 4K. A very addicting game. We've seen people play for hours!

**ADVENTURE CRACKER™** \$14.95 ML. displays all words in memory, even from BASIC programs.

**ALPHABETIC OUTLAWS™** \$19.95 16K BASIC. Can you find the words in hiding?

**THE HANGMAN'S WORKSHOP™** \$19.95 16K BASIC. Plays Hangman but you can't lose.



**SPEAK UP!™** \$29.95 16K/32K ML. Voice Synthesizer with text to speech!

**SPECIAL OFFER:**  
Order 4 or more and take off 20%!



*Classical Computing, Inc.*

P.O. Box 3318, Chapel Hill, NC 27515  
800-334-0854 Ext. 890





```

10030 PRINT "TO RETURN TO MENU,
PRESS '0' ";
10040 KEY$ = INKEY$
10050 IF KEY$="" THEN 10040
10060 IF KEY$=" " THEN RETURN
10070 IF KEY$="0" THEN RETURN

```

This subroutine is called by both modules. See lines 1610 and 2410.

The READ RECORD SUBROUTINE is called by both modules. See lines 1210 and 2210.

```

ELSE 10040
10099 :
11000 REM**READ RECORD SUBR.
11010 READ NAYM$
11020 READ STR, CON, SIZ, INQ, P
OW, DEX, CHA
11030 RETURN

```

The PRINT RECORD SUBROUTINE is called by both modules. See lines 1230 and 2220.

```

12000 REM**PRINT RECORD SUBR.
12010 CLS
12020 PRINT NAYM$: PRINT
12030 PRINT "STR", STR
12040 PRINT "CON", CON
12050 PRINT "SIZ", SIZ
12060 PRINT "INT", INQ
12070 PRINT "POW", POW
12080 PRINT "DEX", DEX
12090 PRINT "CHA", CHA: RETURN
12099 :

```

Here is the **data base**, the **file of records** about characters.

```

30000 REM**CHARACTER RECORDS
30010 DATA ALOYSIOUS, 10, 11, 10
, 12, 10, 12, 9
30020 DATA BAROSTAN, 17, 17, 13,
8, 7, 15, 6
30030 DATA BRIDLA, 11, 12, 10, 1
5, 6, 11, 16
30040 DATA DERNFARA, 13, 13, 8,
13, 4, 17, 6
30050 DATA JOLEEN, 13, 11, 7, 13
, 8, 17, 13
30060 DATA ROKANA, 9, 9, 9, 17,
18, 9, 10
30070 DATA ENDFILE, 0, 0, 0, 0,
0, 0, 0

```

Each record consists of a name followed by seven numbers. The last record (ENDFILE) is not an actual character record. It simply marks the end of the file. Add as many records as you want, beginning at line 30070, then put ENDFILE as the last record in *your* file.

**YOUR TURN.** Modify the program in any of the following ways.

1. Change the CHARACTER FINDER module so you look up a character without spelling the full name. For example, type only "A" to find ALOYSIOUS. This works since this is the only record beginning with A. To find BRIDLA, type "BR" and to find BAROSTAN, type

"BA." If you type just "B," you will find BAROSTAN since his record occurs before BRIDLA's record.

2. Modify the program to store the name and the *six* basic characteristics for a *Dungeons & Dragons* Character.

| CHARACTERISTIC | ABBREVIATION |
|----------------|--------------|
| Strength       | STR          |
| Constitution   | CON          |
| Intelligence   | INT          |
| Wisdom         | WIS          |
| Dexterity      | DEX          |
| Charisma       | CHA          |

3. Expand the amount of information stored for each character or change the type of information completely—how about a name, address, and telephone number file? Look up information by name (or partial name) or by telephone number.

4. Rewrite the program so the records are first read into *arrays* or *subscripted variables*. For example, the information for Aloysious is read into NAYM\$(1), STR(1), CON(1), SIZ(1), INT(1), POW(1), DEX(1), and CHA(1). The information for Barostan is read into NAYM\$(2), STR(2), CON(2), SIZ(2), INT(2), POW(2), DEX(2), and CHA(2). And so on—where will you put the ENDFILE information?

How do you get the information into the arrays? Here are three possibilities:

- Read the information from *DATA* statements.
- Load the information from a *cassette file*.
- Load the information from a *disk file*.



1210 E. Colonial Drive • Orlando, Florida 32803

JFD- COCO DISC SYSTEM- \$439.

**DISK DRIVES \$250**

with

**POWER SUPPLY & CASE**

**64K RAM \$49.<sup>95</sup>**

**One Drive Disk cable . . . . . \$19.95**

**Two Drive Disk cable . . . . . \$29.95**

**Voice: 305-894-1887**

**Data: 305-894-1886**



No C.O.D.'s Please  
Cashiers Check or M.O.

Surely, but slowly, we will explore most of the above.

### The Name Machine

The sound of a name is determined by its consonant—vowel structure. Here is a program that lets the user specify the sequence of consonants and vowels for random names. For example, a *RUN* might go like this:

NAME STRUCTURE? CVCVC

20 names

FOR MORE NAMES, PRESS SPACE  
FOR NEW STRUCTURE, PRESS "S"

Consonant, vowel,  
consonant, vowel,  
consonant.



If you press the space bar, you get 20 more names of the form CVCVC. But if you press the "S" key, you can enter a new structure.

When the CoCo asks NAME STRUCTURE? enter a string of Cs and Vs, C for consonant, V for vowel. Here are some examples.

| NAME STRUCTURE | POSSIBLE NAMES      |
|----------------|---------------------|
| CVC            | TOM, ZAP, GUZ, JYM  |
| VCVC           | ZMOS, ENAP, ITOK    |
| CVCVC          | ROKAN, TOMAR, ZULAK |

You can sometimes convert a masculine sounding name to a feminine sounding name by adding a vowel. For example, ROKAN and ROKANA.

```
100 REM**RANDOM NAMES
```

```
200 REM**GET NAME STRUCTURE NS$
```

```
210 CLS
```

```
220 INPUT "NAME STRUCTURE"; NS$
```

```
300 REM**MAKE & PRINT NAMES
```

```
310 CLS
```

```
320 PRINT "NAME STRUCTURE: " NS$
```

```
330 PRINT
```

```
340 FOR K=1 TO 20
```

```
350 : GOSUB 610
```

```
360 : PRINT NAME$,
```

```
370 NEXT K
```

```
500 REM**TELL HOW TO DO AGAIN
```

```
510 PRINT
```

```
520 PRINT "FOR MORE NAMES, PRESS
SPACE"
```

```
530 PRINT "FOR NEW STRUCTURE, PR
ESS 'S'";
```

```
540 K$=INKEY$: IF K$="" THEN 540
```

```
550 IF K$=" " THEN 310
```

```
560 IF K$="S" THEN 210 ELSE 540
```

```
600 REM**MAKE A NAME SUBR.
```

```
610 NAME$ = ""
```

```
620 FOR KK=1 TO LEN(NS$)
```

```
630 : CV$ = MID$(NS$, KK, 1)
```

**GRAN PRIX**

VROOM! Speed, skill, & total concentration. . . Your joystick controls the speed & steering of your car as you race over the track, dodging competing racers. You drive through the Morocco Gran Prix, racing against the clock, gaining points for distance covered on the track. You'll be so involved with the race that you can almost taste the road dust, smell the burning rubber, & feel the press of speed against your chest. (Requires 32K)

cassette \$21<sup>95</sup>    disk \$26<sup>95</sup>    add \$2<sup>00</sup> shipping

**COMPUTERWARE**®

Box 668 • Encinitas, CA 92024

Dealer Inquiries Invited (619) 436-3512

**NOW a good used line printer**  
**CENTRONICS 588**

132 characters per line  
Sprocket feed - Adjustable width  
Dot Matrix 5 X 7  
Print rate 88 char. per second  
One line buffer  
H = 13-3/4"    D = 21-2/3"  
W = 32"    Weight = 98 lbs.

CENTRONICS 588 (used) serial 600  
Baud, with 4 pin DIN plug \$315.00

CENTRONICS 588 (used) parallel feed  
44 pin edge card    \$275.00

All prices F.O.B. Henderson, Tx.  
Terms: Cash, check or COD  
Tx. residents add 4% sales tax

LEADER SALES CORPORATION  
P.O. Box 1220, Henderson, Tx. 75653  
Ph. 214-657-7800 after 6 PM  
Discounts available to CC clubs and  
volume buyers.



```

640 : IF CV$="C" THEN GOSUB 810
650 : IF CV$="V" THEN GOSUB 910
660 NEXT KK
670 RETURN

```

```

800 REM**ADD A CONSONANT SUBR.
810 C$="BCDFGHJKLMNPQRSTVWXYZ"
820 RC = RND(21)
830 RC$ = MID$(C$, RC, 1)
840 NAME$ = NAME$ + RC$
850 RETURN

```

```

900 REM**ADD A VOWEL SUBR.
910 V$="AEIOUY"
920 RV = RND(6)
930 RV$ = MID$(V$, RV, 1)
940 NAME$ = NAME$ + RV$
950 RETURN
999 END

```

To get two hugs with one smile  
 To get two smiles with one hug  
 To feed two birds with one worm  
 To embarrass two politicians with one truth

Please help inundate Dick with good slogans. Send them to Dick Ricketts, *The Computing Teacher*, University of Oregon, Eugene, OR 97403.

### Coming Attractions

Surely, but slowly, we will explore the following things:

- The elusive *RND*
- GameMaster's Dice
- Looking up stuff in files. First, files of information in *DATA* statements and arrays. Next, cassette files. Eventually, disk files.
- Whatever else comes to mind or is suggested by you.

### In Pursuit Of Non-Violence

We have been challenged by Dick Ricketts, editor of *The Computing Teacher*, to replace the violent phrase "To kill two birds with one stone" with something less violent. Several of us are working on this problem. From time to time, we will send Dick a shoebox full of replacement phrases written on bar napkins, backs of envelopes, cash register receipts, and other exotic media. Here are a few samples.

What do *you* want? If it fits into the general idea of "GameMaster's Apprentice," we might do it. Send your suggestions, complaints, kudos, requests, whatever. . . to George & Bob, P.O. Box 310, Menlo Park, CA 94025.

## Marymae INDUSTRIES, INC.

In Texas, Orders,  
 Questions & Answers  
 1-713-392-0747

22511 Katy Freeway  
 Katy (Houston), Texas 77450

To Order  
 1-800-231-3680  
 800-231-3681

### SAVE BIG DOLLARS ON ALL TRS-80® HARDWARE & SOFTWARE

TRS-80® by Radio Shack. Brand new in cartons delivered. Save state sales tax. Texas residents, add only 5% sales tax. Open Mon. - Fri., 9 - 6, Sat., 9 - 1. We pay freight and insurance. Come by and see us. Call us for a reference in or near your city. Ref: Farmers State Bank, Brookshire, Texas.

### WE OFFER ON REQUEST

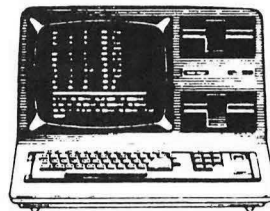
Federal Express (overnight delivery)

Houston Intercontinental Airport  
 Delivery, Same Day Service

U.P.S. BLUE—Every Day

References from people who have  
 bought computers from us probably  
 in your city. We have thousands  
 of satisfied customers. WE WILL  
 NOT BE UNDERSOLD!

ED McMANUS



AMERICAN EXPRESS  
 Cards  
 Welcome

- 
- 
- 
- 

No Tax on Out of Texas Shipments!

Save  
 10% 15%  
 OR MORE

### WE ALWAYS OFFER

- We accept MasterCard, Visa and American Express cards
- We use Direct Freight lines. No long waits
- We always pay the freight and insurance
- Toll free order number
- Our capability to go to the giant TRS-80® Computer warehouse 5 hours away, in Ft. Worth, Texas, to keep *you* in stock.

® TRS-80 is a Registered Trademark of Tandy Corp.

JOE McMANUS



TELEX: 77-4132 (FLEXS HOU)

# COLOR COMPUTER MEMORY MAP

By BOB RUSSELL

This is the first installment in a comprehensive series of references on the Color Computer memory, and covers Random Access Memory (RAM).

This memory map has been created after many hours of research, investigation and experimentation. I probably have over 650 hours already invested in this project and I know I am not finished. I fully intend to offer periodic updates to this document. My wish is that this will become a living, growing document that you will also contribute to. I hope you will bring any errors to my attention and also share any unmapped discoveries you may have made.

Among those publications offering the most accurate and reliable memory information are Radio Shack's Service Manual, *Color Computer News* and *the Rainbow*. If you refer to these resources you will often find detailed information (sometimes even a commented listing that can be matched to a disassembled listing to really describe what is going on!). Throughout the Map, I will refer to some of these resources.

An \*S\* indicates a ROM or RAM based routine that you could potentially call from your own assembly language program. \$nnn is a notation for hexadecimal values.

Sources referred to in this map:

- 1) *Getting Started With Color BASIC*  
Copyright 1981 Tandy Corp.  
Fort Worth, TX 76102
- 2) *Going Ahead With Extended BASIC*  
Copyright 1981 Tandy Corp.  
Forth Worth, TX 76102
- 3) *Service Manual, TRS-80 Color Computer*  
Catalog Number 26-3001/3002
- 4) *TRS-80 Microcomputer News*  
(for TRS-80 users)  
P.O. Box 2910  
Forth Worth, TX 76113-2910
- 5) *Color Computer News*  
REMarkable Software  
P.O. Box 1192  
Muskegan, MI 49443
- 6) *the Rainbow*  
9529 U.S. Highway 42  
P.O. Box 209  
Prospect, KY 40059
- 7) *80 Micro*  
80 Pine Street  
Peterborough, NH 03458

If you don't want to cut up your *Rainbow* Magazine you may purchase copies of the Memory Map in its entirety, enclosed in an attractive cover, for \$9 (Wisconsin residents should add five percent for sales tax.). I invite dealer and computer club volume purchases at discounted prices.

For making inquiries or placing orders, write: Bob Russell, N5474 Stillwater Court, Fredonia, WI 53021.

*Reproduction or translation of any portion of this work without permission from R. R. Enterprises is prohibited. While reasonable time and effort has been taken in preparation of this Memory Map to assure its accuracy, R. R. Enterprises assumes no liability resulting from any errors or omissions in this manual, or from the use of the information obtained herein.*

Color Computer Memory Map: © 1983 R. R. Enterprises: All Rights Reserved



| Beginning<br>DEC<br>ADDR | Ending<br>HEX<br>ADDR | Beginning<br>DEC<br>ADDR | Ending<br>HEX<br>ADDR | Description                                                                                      |
|--------------------------|-----------------------|--------------------------|-----------------------|--------------------------------------------------------------------------------------------------|
| 00000                    | 0000                  | 32767                    | 7FFF                  | RAM                                                                                              |
| 00000                    | 0000                  | 01023                    | 03FF                  | System Use                                                                                       |
| 00003                    | 0003                  |                          |                       | General Counter                                                                                  |
| 00006                    | 0006                  |                          |                       | String flag                                                                                      |
| 00007                    | 0007                  |                          |                       | Garbage Collection Flag                                                                          |
| 00025                    | 0019                  | 00026                    | 001A                  | Address of start of BASIC program                                                                |
| 00027                    | 001B                  | 00028                    | 001C                  | Address of start of variable storage also<br>address-1 is end of BASIC program                   |
| 00029                    | 001D                  | 00030                    | 001E                  | Address of start of arrays (subscripted<br>variable storage)                                     |
| 00031                    | 001F                  | 00032                    | 0020                  | Address of beginning of free memory used in<br>NEW command.                                      |
| 00033                    | 0021                  | 00034                    | 0022                  | Address of start of string pool (string stack)                                                   |
| 00035                    | 0023                  | 00036                    | 0024                  | Address of Basic limit                                                                           |
| 00037                    | 0025                  |                          |                       | Pointer to string in string pool                                                                 |
| 00039                    | 0027                  | 00040                    | 0028                  | Highest available ram address (end of string<br>pool)                                            |
| 00051                    | 0033                  | 00052                    | 0034                  | Pointer to values in data statements                                                             |
| 00065                    | 0041                  | 00072                    | 0048                  | Scratch area used by Tokenizing routine, garbag<br>collection routine, move memory block routine |
| 00065                    | 0041                  | 00072                    | 0048                  | Data for Block Move                                                                              |
| 00065                    | 0041                  | 00066                    | 0042                  | High end destination address                                                                     |
| 00067                    | 0043                  | 00068                    | 0044                  | High end origin address                                                                          |
| 00069                    | 0045                  | 00070                    | 0046                  | Low end destination address                                                                      |
| 00071                    | 0047                  | 00072                    | 0048                  | Low end origin address                                                                           |
| 00079                    | 004F                  | 00084                    | 0054                  | Floating point accumulator 1 (FPAC1)                                                             |
| 00079                    | 004F                  |                          |                       | Exponent                                                                                         |
| 00080                    | 0050                  | 00083                    | 0053                  | Mantissa                                                                                         |
| 00084                    | 0054                  |                          |                       | Sign                                                                                             |

| Beginning<br>DEC<br>ADDR | Ending<br>HEX<br>ADDR | Beginning<br>DEC<br>ADDR | Ending<br>HEX<br>ADDR | Description                                                                                                                                                                                                                                      |
|--------------------------|-----------------------|--------------------------|-----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 00000                    | 0000                  | 32767                    | 7FFF                  | RAM Cont.                                                                                                                                                                                                                                        |
| 00000                    | 0000                  | 01023                    | 03FF                  | System Use Cont.                                                                                                                                                                                                                                 |
| 00086                    | 0056                  |                          |                       | String variable length                                                                                                                                                                                                                           |
| 00092                    | 005C                  | 00097                    | 0061                  | Floating point accumulator 2 (FPAC2)                                                                                                                                                                                                             |
| 00092                    | 005C                  |                          |                       | Exponent                                                                                                                                                                                                                                         |
| 00093                    | 005D                  | 00096                    | 0060                  | Mantissa                                                                                                                                                                                                                                         |
| 00097                    | 0061                  |                          |                       | Sign                                                                                                                                                                                                                                             |
| 00098                    | 0062                  |                          |                       | Sign comparison                                                                                                                                                                                                                                  |
| 00099                    | 0063                  |                          |                       | Extended precision byte                                                                                                                                                                                                                          |
| 00108                    | 006C                  |                          |                       | Current column position (value of pos)                                                                                                                                                                                                           |
| 00111                    | 006F                  |                          |                       | Device DEVNUM[2]<br>-2=Printer<br>-1=Cassette<br>0=Screen<br>1-15 File for Disk BASIC                                                                                                                                                            |
| 00113                    | 0071                  |                          |                       | Warm start flag (RSTFLAG[2])<br>\$12= Do warm start<br>\$0 = Condition before cartridge prog.<br>starts created by BASIC<br><br>\$55= IF RSTVEC[2] points to a NOP \$12 then<br>control is transferred to address RSTVEC<br>else BASIC starts up |
| 00114                    | 0072                  | 00115                    | 0073                  | Warm start vector address (RSTVEC[2]). At power<br>up this contains \$80C0                                                                                                                                                                       |
| 00116                    | 0074                  | 00117                    | 0075                  | Highest physical memory address                                                                                                                                                                                                                  |
| 00124                    | 007C                  |                          |                       | Block type BLKTYP[2]<br>0=file header<br>1=data<br>FF=end of file                                                                                                                                                                                |
| 00125                    | 007D                  |                          |                       | Bytes in block 0-255 BLKLEN[2]<br>Z=1,A=CSRERR=0 for no errors<br>Z=0,A=CSRERR=1 for checksum error<br>Z=0,A=CSRERR=2 for memory error                                                                                                           |

| Beginning<br>DEC<br>ADDR | Ending<br>HEX<br>ADDR | Beginning<br>DEC<br>ADDR | Ending<br>HEX<br>ADDR | Description                                                                                |
|--------------------------|-----------------------|--------------------------|-----------------------|--------------------------------------------------------------------------------------------|
| 00000                    | 0000                  | 32767                    | 7FFF                  | RAM Cont.                                                                                  |
| 00000                    | 0000                  | 01023                    | 03FF                  | System Use Cont.                                                                           |
| 00126                    | 007E                  |                          |                       | Buffer address CBUFAD[2]. Also program end address + 1 after CLOADM.                       |
| 00128                    | 0080                  |                          |                       | Checksum                                                                                   |
| 00129                    | 0081                  |                          |                       | CSRERR[2]                                                                                  |
| 00130                    | 0082                  |                          |                       | General counter                                                                            |
| 00131                    | 0083                  |                          |                       | Pulse width count                                                                          |
| 00132                    | 0084                  |                          |                       | Rise/fall flag (0=rise)                                                                    |
| 00133                    | 0085                  |                          |                       | Last sine value                                                                            |
| 00136                    | 0088                  | 00137                    | 0089                  | Address of current cursor location                                                         |
| 00138                    | 008A                  | 00139                    | 008B                  | 2 bytes always containing zeros                                                            |
| 00140                    | 008C                  |                          |                       | Pitch of sound (frequency)                                                                 |
| 00141                    | 008D                  | 00142                    | 008E                  | Duration of sound                                                                          |
| 00143                    | 008F                  |                          |                       | Full wave threshold \$12                                                                   |
| 00144                    | 0090                  |                          |                       | Noise rejection \$18                                                                       |
| 00145                    | 0091                  |                          |                       | Half wave threshold \$0A                                                                   |
| 00146                    | 0092                  |                          |                       | Gap length \$80. Controls length of unmodulated carrier preceding I/O Ref. [6]Vol II No. 2 |
| 00148                    | 0094                  |                          |                       | Cursor color (poke 0 to make cursor disappear)                                             |
| 00149                    | 0095                  | 00156                    | 009C                  | Printer variables                                                                          |
| 00149                    | 0095                  | 00150                    | 0096                  | RS-232 baud rate LPTBTD[2]                                                                 |
|                          | HEX                   | MSB, LSB(Decimal)        | Baud                  |                                                                                            |
|                          |                       | 149 150                  |                       |                                                                                            |
|                          | \$02EB                | 2, 235                   | 75                    |                                                                                            |
|                          | \$01CA                | 1, 202                   | 120                   |                                                                                            |
|                          | \$0173                | 1, 115                   | 150                   |                                                                                            |
|                          | \$00BE                | 0, 180                   | 300                   |                                                                                            |
|                          | \$0057                | 0, 87                    | 600                   | Default                                                                                    |
|                          | \$0029                | 0, 41                    | 1200                  |                                                                                            |
|                          | \$0012                | 0, 18                    | 2400                  |                                                                                            |
|                          | \$0006                | 0, 6                     | 4800                  |                                                                                            |
|                          | \$0001                | 0, 1                     | 9600                  |                                                                                            |

| Beginning<br>DEC<br>ADDR | Ending<br>HEX<br>ADDR | Beginning<br>DEC<br>ADDR | Ending<br>HEX<br>ADDR | Description                                                                                                         |
|--------------------------|-----------------------|--------------------------|-----------------------|---------------------------------------------------------------------------------------------------------------------|
| 00000                    | 0000                  | 32767                    | 7FFF                  | RAM Cont.                                                                                                           |
| 00000                    | 0000                  | 01023                    | 03FF                  | System Use Cont.                                                                                                    |
| 00149                    | 0095                  | 00156                    | 009C                  | Printer variables Cont.                                                                                             |
| 00151                    | 0097                  | 00152                    | 0098                  | RS-232 line return delay LPTLND[2]                                                                                  |
|                          | HEX                   | MSB, LSB(Decimal)        | Delay in sec.         |                                                                                                                     |
|                          |                       | 151 152                  |                       |                                                                                                                     |
|                          | \$0001                | 0, 1                     | 0                     | Default                                                                                                             |
|                          | \$4000                | 64, 0                    | .288                  |                                                                                                                     |
|                          | \$8000                | 128, 0                   | .576                  |                                                                                                                     |
|                          | \$FFFF                | 255, 255                 | 1.15                  |                                                                                                                     |
| 00153                    | 0099                  |                          |                       | RS-232 comma field width \$10 OR 16 DEFAULT                                                                         |
| 00154                    | 009A                  |                          |                       | RS-232 last comma field width \$70 OR 112 default                                                                   |
| 00155                    | 009B                  |                          |                       | RS-232 line printer width                                                                                           |
|                          | HEX                   | (Decimal)                | char/line             |                                                                                                                     |
|                          | \$10                  | 16                       | 16                    |                                                                                                                     |
|                          | \$20                  | 32                       | 32                    |                                                                                                                     |
|                          | \$40                  | 64                       | 64                    |                                                                                                                     |
|                          | \$84                  | 132                      | 132                   | Default                                                                                                             |
|                          | \$FF                  | 255                      | 255                   |                                                                                                                     |
| 00156                    | 009C                  |                          |                       | Print head position LPTPOS[2]                                                                                       |
| 00157                    | 009D                  | 00158                    | 009E                  | Transfer address after CLOADM. Ref. [6]Vol. II No 2.                                                                |
| 00159                    | 009F                  | 00168                    | 00A8                  | *S* Get next character routine. A JSR \$009F will get the next byte. JSR \$00A5 will get the same byte. Ref [5] #12 |
| 00166                    | 00A6                  | 00167                    | 00A7                  | Next character pointer                                                                                              |
| 00168                    | 00A8                  | 00170                    | 00AA                  | Vector to 43376. Contains \$7EAA1A (jump AA1A) to print "OK"                                                        |
| 00171                    | 00AB                  | 00174                    | 00AE                  | Extended product area 32 bits of a 64                                                                               |
| 00181                    | 00B5                  | 00219                    | 00DB                  | Graphics data/constants                                                                                             |
| 00181                    | 00B5                  |                          |                       | Current color; if 4 color mode legal values are \$00,\$55,\$AA,\$FF; if 2 color mode legal values are \$00 or \$FF  |
| 00182                    | 00B6                  |                          |                       | Current Pmode                                                                                                       |



| Beginning<br>DEC<br>ADDR | Ending<br>HEX<br>ADDR | Beginning<br>DEC<br>ADDR | Ending<br>HEX<br>ADDR | Description                                                                                                                       |
|--------------------------|-----------------------|--------------------------|-----------------------|-----------------------------------------------------------------------------------------------------------------------------------|
| 00000                    | 0000                  | 32767                    | 7FFF                  | RAM Cont.                                                                                                                         |
| 00000                    | 0000                  | 01023                    | 03FF                  | System Use Cont.                                                                                                                  |
| 00181                    | 00B5                  | 00219                    | 00DB                  | Graphics data/constants cont.                                                                                                     |
| 00185                    | 00B9                  |                          |                       | Number of bytes per line                                                                                                          |
| 00186                    | 00BA                  |                          |                       | Address of top of graphics page                                                                                                   |
| 00188                    | 00BC                  |                          |                       | Contains \$0E if Disk system else \$06                                                                                            |
| 00189                    | 00BD                  |                          |                       | X1                                                                                                                                |
| 00191                    | 00BF                  |                          |                       | Y1                                                                                                                                |
| 00195                    | 00C3                  |                          |                       | X2                                                                                                                                |
| 00197                    | 00C5                  |                          |                       | Y2                                                                                                                                |
| 00219                    | 00DB                  |                          |                       | Change flag                                                                                                                       |
| 00230                    | 00E6                  |                          |                       | Baud rate constant                                                                                                                |
| 00231                    | 00E7                  |                          |                       | Input timeout constant                                                                                                            |
| 00234                    | 00EA                  | 00239                    | 00EF                  | Disk I/O variables [5] #9                                                                                                         |
| 00234                    | 00EA                  |                          |                       | Disk operation code                                                                                                               |
| 00235                    | 00EB                  |                          |                       | Drive number                                                                                                                      |
| 00236                    | 00EC                  |                          |                       | Track number                                                                                                                      |
| 00237                    | 00ED                  |                          |                       | Sector number                                                                                                                     |
| 00238                    | 00EE                  | 00239                    | 00EF                  | Buffer address                                                                                                                    |
| 00240                    | 00F0                  |                          |                       | Disk status returned                                                                                                              |
| 00256                    | 0100                  | 00273                    | 0111                  | Interrupt vectors                                                                                                                 |
| 00256                    | 0100                  | 00258                    | 0102                  | SWI3 - Software Interrupt 3 called from \$FFF2<br>Execution of a SWI3 instruction (\$113F) will<br>stack registers and jump here. |
| 00259                    | 0103                  | 00261                    | 0105                  | SWI2 - Software Interrupt 2 called from \$FFF4<br>Execution of a SWI2 instruction (\$103F) will<br>stack registers and jump here. |
| 00262                    | 0106                  | 00264                    | 0108                  | SWI1 - Software Interrupt 1 called from \$FFFA<br>Execution of a SWI1 instruction (\$3F) will<br>stack registers and jump here.   |

| Beginning<br>DEC<br>ADDR | Ending<br>HEX<br>ADDR | Beginning<br>DEC<br>ADDR | Ending<br>HEX<br>ADDR | Description                                                                                                                                                                                                                                                                                                                                                                                                                           |
|--------------------------|-----------------------|--------------------------|-----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 00000                    | 0000                  | 32767                    | 7FFF                  | RAM Cont.                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 00000                    | 0000                  | 01023                    | 03FF                  | System Use Cont.                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 00256                    | 0100                  | 00273                    | 0111                  | Interrupt vectors Cont.                                                                                                                                                                                                                                                                                                                                                                                                               |
| 00265                    | 0109                  | 00267                    | 010B                  | NMI - Non-Maskable Interrupt called from<br>\$FFFC Set to \$7ED7AE (JMP \$D7AE) by<br>initialization of Disk Operating System.                                                                                                                                                                                                                                                                                                        |
| 00268                    | 010C                  | 00270                    | 010E                  | IRQ - Interrupt Request called from \$FFF8<br>Set to \$7EA9B3 (JMP \$A9B3) by initialization<br>of Basic. Set to \$7E894C (JMP \$894C) by<br>initialization of Extended Basic. Set to<br>\$7ED7BC (JMP \$D7BC) by initialization of the<br>Disk Operating System. This is primarily a<br>timing interrupt and is used by SOUND & TIMER<br>commands and to turn off Disk Motor when disk<br>has not been accessed for several seconds. |
| 00271                    | 010F                  | 00273                    | 0111                  | FIRQ - Fast Interrupt Request called from<br>\$FFF6. Set to \$7EA0F6 (JMP \$A0F6) by<br>initialization of Basic. This causes a jump<br>to the cartridge port in the expansion<br>interface.                                                                                                                                                                                                                                           |
| 00274                    | 0112                  | 00276                    | 0114                  | *S* Execution of "USR" Basic function (Token<br>\$FF83) USRJMP jump to basic's usr routine[1]<br>also 274-275 high and low order bytes of<br>TIMER Ref. [6] Vol II No 2                                                                                                                                                                                                                                                               |
| 00278                    | 0116                  | 00281                    | 0119                  | Seed for RND function Ref. [6] Vol II No 2                                                                                                                                                                                                                                                                                                                                                                                            |
| 00282                    | 011A                  |                          |                       | Keyboard alpha lock (upper or lower case<br>selection) [1]<br>0 = not locked (lower case)<br>1 = locked (upper case)                                                                                                                                                                                                                                                                                                                  |
| 00283                    | 011B                  | 00284                    | 011C                  | Keyboard delay constant[1]                                                                                                                                                                                                                                                                                                                                                                                                            |
| 00285                    | 011D                  | 00287                    | 011F                  | Vector to 45509. Contains \$7E8489<br>(JMP \$8489)                                                                                                                                                                                                                                                                                                                                                                                    |

| Beginning<br>DEC<br>ADDR | Ending<br>HEX<br>ADDR | Beginning<br>DEC<br>ADDR | Ending<br>HEX<br>ADDR | Description                                                                                                                     |
|--------------------------|-----------------------|--------------------------|-----------------------|---------------------------------------------------------------------------------------------------------------------------------|
| 00000                    | 0000                  | 32767                    | 7FFF                  | RAM Cont.                                                                                                                       |
| 00000                    | 0000                  | 01023                    | 03FF                  | System Use Cont.                                                                                                                |
| 00288                    | 0120                  | 00316                    | 013C                  | Token Table Directory Ref. [5] No.7 and Ref.<br>[7] December Anniversary Issue                                                  |
| 00288                    | 0120                  | 00292                    | 0124                  | Basic Commands                                                                                                                  |
| 00288                    | 0120                  |                          |                       | Number of BASIC command keywords in token<br>table located at \$AA66-\$AB19 (\$35)                                              |
| 00289                    | 0121                  | 00290                    | 0122                  | Address of BASIC Command Keyword Table<br>(\$AA66)                                                                              |
| 00291                    | 0123                  | 00292                    | 0124                  | Address of table of pointers to BASIC<br>Command subroutine entry addresses<br>(\$AB67)                                         |
| 00293                    | 0125                  | 00297                    | 0129                  | Basic Functions                                                                                                                 |
| 00293                    | 0125                  |                          |                       | Number of BASIC function keywords in token<br>table located at \$AB1A-\$AB66 (\$14)                                             |
| 00294                    | 0126                  | 00295                    | 0127                  | Address of BASIC function Keyword table<br>(\$AB1A)                                                                             |
| 00296                    | 0128                  | 00297                    | 0129                  | Address of table of pointers to BASIC<br>Function subroutine entry addresses<br>(\$AA29)                                        |
| 00298                    | 012A                  | 00302                    | 012E                  | Extended Basic Commands                                                                                                         |
| 00298                    | 012A                  |                          |                       | Number of Extended BASIC Command keywords<br>in token table located at \$8183-\$81EF (\$19)                                     |
| 00299                    | 012B                  | 00300                    | 012C                  | Address of Extended Basic Command keyword<br>table (\$8183)                                                                     |
| 00301                    | 012D                  | 00302                    | 012E                  | Address of a subroutine that determines<br>subroutine entry addresses for tokens<br>\$B5 to \$CB and \$FF90 to \$FF9F. (\$813C) |

| Beginning<br>DEC<br>ADDR | Ending<br>HEX<br>ADDR | Beginning<br>DEC<br>ADDR | Ending<br>HEX<br>ADDR | Description                                                                                                                                               |
|--------------------------|-----------------------|--------------------------|-----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
| 00000                    | 0000                  | 32767                    | 7FFF                  | RAM Cont.                                                                                                                                                 |
| 00000                    | 0000                  | 01023                    | 03FF                  | System Use Cont.                                                                                                                                          |
| 00288                    | 0120                  | 00316                    | 013C                  | Token Table Directory Ref. [5] No.7 and Ref.<br>[7] December Anniversary Issue Cont.                                                                      |
| 00303                    | 012F                  | 00307                    | 0133                  | Extended Basic Functions                                                                                                                                  |
| 00303                    | 012F                  |                          |                       | Number of Extended BASIC Function keywords<br>in token table located at \$821E-\$8272 (\$E)                                                               |
| 00304                    | 0130                  | 00305                    | 0131                  | Address of Extended Basic Function keyword<br>table (\$821E)                                                                                              |
| 00306                    | 0132                  | 00307                    | 0133                  | Address of a subroutine that determines<br>subroutine entry addresses for tokens<br>\$FF94 to \$FF9F with the exception of \$FF90<br>and \$FF9F. (\$8168) |
| 00308                    | 0134                  | 00312                    | 0138                  | Disk Basic Command                                                                                                                                        |
| 00308                    | 0134                  |                          |                       | Number of tokens                                                                                                                                          |
| 00309                    | 0135                  | 00310                    | 0136                  | Address of Keyword Table                                                                                                                                  |
| 00311                    | 0137                  | 00312                    | 0138                  | Address of where to go to execute a token                                                                                                                 |
| 00313                    | 0138                  | 00317                    | 013C                  | Disk Basic Function                                                                                                                                       |
| 00313                    | 0138                  |                          |                       | Number of tokens                                                                                                                                          |
| 00314                    | 0139                  | 00315                    | 013A                  | Address of Keyword Table                                                                                                                                  |
| 00316                    | 013B                  | 00317                    | 013C                  | Address of where to go to execute a token                                                                                                                 |



Beginning Ending  
 DEC HEX DEC HEX  
 ADDR ADDR ADDR ADDR

Description

00000 0000 32767 7FFF RAM Cont.

00000 0000 01023 03FF System Use Cont.

00338 0152 00345 0159 Keyboard rollover table [4] Oct 1981

|            |       |       |   |   |   |   |   |             |  |
|------------|-------|-------|---|---|---|---|---|-------------|--|
|            | Bit 7 | 6     | 5 | 4 | 3 | 2 | 1 | 0           |  |
| 00338 0152 |       | ENTER | 8 | 0 | X | P | H | 0           |  |
| 00339 0153 |       | CLEAR | 9 | 1 | Y | Q | I | A           |  |
| 00340 0154 |       | :     | 2 | Z | R | J | B |             |  |
| 00341 0155 |       | ;     | 3 | - | S | K | C | ~= UP ARROW |  |
| 00342 0156 |       | ,     | 4 | - | T | L | D | ~= DN ARROW |  |
| 00343 0157 |       | -     | 5 | - | U | M | E | ~= LT ARROW |  |
| 00344 0158 |       | .     | 6 | - | V | N | F | ~= RT ARROW |  |
| 00345 0159 |       | /     | 7 | - | W | O | G | ~= BLANK    |  |

Dec val of contents 191 223 239 247 251 253 254  
 of 338-345 if key in  
 col. is pressed

1 1 1 1 1 1 1 1  
 Is the binary value or \$FF or 255  
 when no key is pressed

If right joystick fire button is pressed:  
 1 1 1 1 1 1 0  
 Is the binary value or \$FE or 254 at all  
 locations \$152-\$159 or 338-345

If left joystick fire button is pressed:  
 1 1 1 1 1 0 1  
 is the binary value or \$FD OR 253 at all  
 locations \$152-\$159 or 338-345

When a key or mutiple keys are  
 simultaneously pressed the 1's toggle to  
 zero bit at col positions corresponding  
 to table above

Example: 'A' key is pressed  
 1 1 1 1 1 1 1 0  
 is the binary val or \$FE OR 254 at  
 location \$153 or 339

Example: 'd' and '4' keys are pressed  
 simultaneously  
 1 1 1 0 1 1 1 0  
 is the binary val or \$EE OR 238 at  
 location \$156 OR 342

Beginning Ending  
 DEC HEX DEC HEX  
 ADDR ADDR ADDR ADDR

Description

00000 0000 32767 7FFF RAM Cont.

00000 0000 01023 03FF System Use Cont.

00346 015A 00349 015D Joystick pot values[1]

00346 015A Joystick 0 x position left  
 00347 015B Joystick 0 y position left  
 00348 015C Joystick 1 x position right  
 00349 015D Joystick 1 y position right

00350 015E 00423 01A8 Hooks to Ram area from Roms. Unless otherwise  
 defined assume Basic initializes hooks with  
 \$39 (RTS) Ref. [5] #11

00350 015E Hook to allow device numbers 1-16 to be  
 opened to disk files. Called from \$A5F7. Set  
 to \$7EC426 (JMP SC426) by initialization of  
 Disk Operating System.

00353 0161 00255 0163 Hook to allow device numbers greater than 0  
 for disk. Called from \$A5B9. Set to \$7EC838  
 (JMP SC838) by intitialization of Disk  
 Operating System.

00356 0164 00358 0166 Hook to return device parameters for disk  
 files such as current position in record,  
 tab length, etc. Called from A35F. Set to  
 \$7EC843 (JMP SC843 by initialization of Disk  
 Operating System.

00359 0167 00361 0169 Hook to allow user interface of other types  
 of terminals or printers with different  
 protocols. This location is referenced during  
 each print. Extended Basic changes graphic  
 screen back to text and ignores output to  
 device #3 used in DLOAD. Disk operating  
 system enables output to disk files. Set to  
 \$39 (RTS) by initialization of Basic. Set to  
 \$7E8273 (JMP \$8273) by initialization of  
 Extended Basic. Set to \$7ECB4A (JMP \$7ECB4A)  
 by Disk Operating System. User may poke or  
 load a JMP to user defined modified RS232  
 driver then exiting driver and executing the  
 proper JMP depending on system being run.  
 Ref. [5] #6 & #11

| Beginning<br>DEC<br>ADDR | Ending<br>HEX<br>ADDR | Beginning<br>DEC<br>ADDR | Ending<br>HEX<br>ADDR | Description                                                                                                                                                                                                              |
|--------------------------|-----------------------|--------------------------|-----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 000000                   | 0000                  | 32767                    | 7FFF                  | RAM Cont.                                                                                                                                                                                                                |
| 000000                   | 0000                  | 01023                    | 03FF                  | System Use Cont.                                                                                                                                                                                                         |
| 003500                   | 015E                  | 00423                    | 01A8                  | Hooks to Ram area from Roms. Unless otherwise defined assume Basic initializes hooks with \$39 (RTS) Ref. [5] #11 Cont.                                                                                                  |
| 003650                   | 016D                  | 00367                    | 016F                  | Hook to make sure that a device number is open for input. Called from \$A3ED. Set to \$7EC818 (JMP \$C818 ) by initialization of Disk Operating System.                                                                  |
| 003710                   | 0173                  | 00373                    | 0175                  | Hook to allow closing of all open files. Called from \$A426. Set to \$7ECA3B (JMP \$CA3B) by initialization of Disk Operating System.                                                                                    |
| 003740                   | 0176                  | 00376                    | 0178                  | Hook to allow closing of the file opened to a specified device number. Called from \$A42D. Set to \$7ECA4B (JMP \$CA4B) by initialization of Disk Operating System. Set to \$7E8286 by initialization of Extended Basic. |
| 003770                   | 0179                  | 00379                    | 017B                  | Hook to enable PRINTUSING statement. Called from \$B918. Set to \$7E8E90 (JMP \$8E90) by initialization of Extended Basic.                                                                                               |
| 003800                   | 017C                  | 00382                    | 017E                  | Hook to enable INPUT statements from disk. Called from \$B061. Set to \$7ECC5B (JMP \$CC5B) by initialization of Disk Operating System.                                                                                  |
| 003830                   | 017F                  | 00385                    | 0181                  | Hook to enable/disable BREAK key. BREAK key is disabled during disk output. Called from \$A549. Set to \$7EC859 (JMP \$C859) by initialization of Disk Operating System.                                                 |
| 003860                   | 0182                  | 00388                    | 0184                  | Hook to enable line input. Called from \$A390. Set to \$39 (RTS) by initialization of Disk Operating System.                                                                                                             |
| 003890                   | 0185                  | 00391                    | 0187                  | Hook to enable cleanup after loading an ASCII file. Called from \$A4BF. Set to \$7ECA36 (JMP \$CA36) by initialization of Disk Operating System.                                                                         |
| 003920                   | 0188                  | 00394                    | 018A                  | Hook to enable check for end of disk file. Called from \$A5CE. Set to \$7EC860 (JMP \$C860) by initialization of Disk Operating System.                                                                                  |
| 003950                   | 018B                  | 00397                    | 018D                  | Hook to evaluate Extended Basic Operands and Functions. Called from \$B223. Set to \$7E8846 (JMP \$8846) by initialization of Extended Basic. Set to \$7ECD66 (JMP \$CDF6) by initialization of Disk Operating System.   |

| Beginning<br>DEC<br>ADDR | Ending<br>HEX<br>ADDR | Beginning<br>DEC<br>ADDR | Ending<br>HEX<br>ADDR | Description                                                                                                                                                                                                                                                                                                                                      |
|--------------------------|-----------------------|--------------------------|-----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 000000                   | 0000                  | 32767                    | 7FFF                  | RAM Cont.                                                                                                                                                                                                                                                                                                                                        |
| 000000                   | 0000                  | 01023                    | 03FF                  | System Use Cont.                                                                                                                                                                                                                                                                                                                                 |
| 003500                   | 015E                  | 00423                    | 01A8                  | Hooks to Ram area from Roms. Unless otherwise defined assume Basic initializes hooks with \$39 (RTS) Ref. [5] #11 Cont.                                                                                                                                                                                                                          |
| 003980                   | 018E                  | 00400                    | 0190                  | Hook to allow a user program to trap errors. Called from \$AC46. Set to \$39 (RTS) by initialization of Disk Operating System. Set to \$7EC70D by initialization of Extended Basic.                                                                                                                                                              |
| 004010                   | 0191                  | 00403                    | 0193                  | Hook to print Extended and Disk Basic Error messages. Also closes files upon errors. Called from \$AC49. Set to \$7E88F0 (JMP \$88F0) by initialization of Extended Basic. Set to \$7EC24D (JMP \$C24D) by initialization of Disk Operating System.                                                                                              |
| 004040                   | 0194                  | 00406                    | 0196                  | Hook to set up Graphics parameters for Extended Basic. Also enables RUN "filename" for Disk Basic. Called from \$AE75. Set to \$7E829C (JMP \$829C) by initialization of Extended Basic. Set to \$7EC990 (JMP \$C990) by initialization of Disk Operating System.                                                                                |
| 004070                   | 0197                  | 00409                    | 0199                  | Hook to enable Hex (&H) and Octal (&O) conversions. Called from \$AD9E. Set to \$7E87E5 (JMP \$87E5) by initialization of Extended Basic.                                                                                                                                                                                                        |
| 004100                   | 019A                  | 00412                    | 019C                  | Hook to allow user control of extended Basic interpreter. Called from \$AD9E after interpreting each Basic statement. Set to \$7E82B9 (JMP \$82B9) by initialization of Extended Basic. Purpose of Hook to Extended Basic is to enable TRACE function. It can be used to disable the BREAK key or SHIFT 0 key. This speeds up Basic. Ref. [5] #6 |
| 004130                   | 019D                  | 00415                    | 019F                  | Hook for Graphics. Called from \$ABC4.                                                                                                                                                                                                                                                                                                           |
| 004160                   | 01A0                  | 00417                    | 01A2                  | Hook to allow Get and Put routines to access disk records. Called from \$8162, \$8AFA, \$975C, \$A910, and \$C29A. Set to \$7EC29A (JMP \$C29A).                                                                                                                                                                                                 |
| 004180                   | 01A3                  | 00420                    | 01A5                  | Hook for Extended Basic interpreter tokenization Called from \$B821. Set to \$7E8304 (JMP \$8304) by initialization of Extended Basic.                                                                                                                                                                                                           |
| 004210                   | 01A6                  | 00423                    | 01A8                  | Hook for Extended Basic interpreter untokenize. Called from \$B7C2.                                                                                                                                                                                                                                                                              |



| Beginning<br>DEC<br>ADDR | Ending<br>HEX<br>ADDR | Beginning<br>DEC<br>ADDR | Ending<br>HEX<br>ADDR | Description                                                                                                       |
|--------------------------|-----------------------|--------------------------|-----------------------|-------------------------------------------------------------------------------------------------------------------|
| 00000                    | 0000                  | 32767                    | 7FFF                  | RAM Cont.                                                                                                         |
| 00000                    | 0000                  | 01023                    | 03FF                  | System Use Cont.                                                                                                  |
| 00465                    | 01D1                  |                          |                       | Length of file                                                                                                    |
| 00466                    | 01D2                  | 00473                    | 01D9                  | Cassette filename 8 bytes                                                                                         |
| 00474                    | 01DA                  | 00731                    | 02D8                  | Cassette buffer 255 bytes                                                                                         |
| 00485                    | 01E5                  | 00486                    | 01E6                  | Transfer address used in CSAVEM command                                                                           |
| 00733                    | 02DD                  | 00988                    | 03DC                  | Keyboard buffer 255 bytes (input terminated by 0). When data is tokenized it is stored starting at 00732 (\$02DC) |
| 00737                    | 02E1                  | 00827                    | 033B                  | Screen Buffer (90 bytes)                                                                                          |
| 01024                    | 0400                  | 01535                    | 05FF                  | Text screen memory (normal video display)[1]                                                                      |
| 01536                    | 0600                  | 13823                    | 35FF                  | GRAPHICS PAGE AREA[2]                                                                                             |
| 01536                    | 0600                  | 03071                    | 0BFF                  | Page 1                                                                                                            |
| 03072                    | 0C00                  | 04607                    | 11FF                  | Page 2                                                                                                            |
| 04608                    | 1200                  | 06143                    | 17FF                  | Page 3                                                                                                            |
| 06144                    | 1800                  | 07679                    | 1DFF                  | Page 4                                                                                                            |
| 07680                    | 1E00                  | 09215                    | 23FF                  | Page 5                                                                                                            |
| 09216                    | 2400                  | 10751                    | 29FF                  | Page 6                                                                                                            |
| 10752                    | 2A00                  | 12287                    | 2FFF                  | Page 7                                                                                                            |
| 12288                    | 3000                  | 13823                    | 35FF                  | Page 8                                                                                                            |
| 01536                    | 0600                  | 02438                    | 0986                  | Disk buffers,variable storage, and DOS variable storage (NOTE CONFLICT WITH GRAPHICS PAGE 1!!!!) Ref. [5] #9.     |
| 01536                    | 0600                  | 01791                    | 06FF                  | Disk buffer for Disk I/O - 1 sector long - 256 bytes                                                              |
| 01792                    | 0700                  | 02047                    | 07FF                  | Disk buffer for Disk I/O - 1 sector long - 256 byte                                                               |
| 02048                    | 0800                  | 02343                    | 0927                  | Disk drive table - 74 bytes data per drive                                                                        |
| 02344                    | 0928                  |                          |                       | Start of DOS variables                                                                                            |

| Beginning<br>DEC<br>ADDR | Ending<br>HEX<br>ADDR | Beginning<br>DEC<br>ADDR | Ending<br>HEX<br>ADDR | Description                                                                                                                                                                                              |
|--------------------------|-----------------------|--------------------------|-----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 00000                    | 0000                  | 32767                    | 7FFF                  | RAM Cont.                                                                                                                                                                                                |
| 01536                    | 0600                  | 02438                    | 0986                  | Disk buffers,variable storage, and DOS variable storage (NOTE CONFLICT WITH GRAPHICS PAGE 1!!!!) Ref. [5] #9. Cont.                                                                                      |
| 02430                    | 097E                  | 02438                    | 0986                  | Disk variable storage                                                                                                                                                                                    |
| 02430                    | 097E                  |                          |                       | Start of table of current tracks                                                                                                                                                                         |
| 02434                    | 0982                  |                          |                       | NMI in use flag                                                                                                                                                                                          |
| 02435                    | 0983                  |                          |                       | Address of return after NMI interrupt                                                                                                                                                                    |
| 02437                    | 0985                  |                          |                       | Motor shutoff counter                                                                                                                                                                                    |
| 02438                    | 0986                  |                          |                       | Current Latch data - status of 1793 register in RAM                                                                                                                                                      |
| 13824                    | 3600                  | 32767                    | 7FFF                  | Program and variable storage (program and variable storage could actually begin anywhere from 03072 to 13824 (allowing for Disk Operating System operation) depending on graphics page area required)[1] |

# PRINTOUT AT *PMODE 4*

By Joseph Kohn

Most of the graphics screen print routines available support the dot addressable capabilities of the TRS line printers. This has left those of us with Microline printers, and perhaps Epson, out in the cold. This machine language routine allows any *PMODE 4* screen to be dumped to a Microline printer.

By using eight lines per inch, compressed printing, and six-block graphics characters, the Microlines can fill a large portion of an 8½ x 11 page with the full high-resolution screen. The main body of the program is concerned with translating the graphics pixels into six-block printer graphics characters.

The six-block characters can be treated as six pixels, two across by

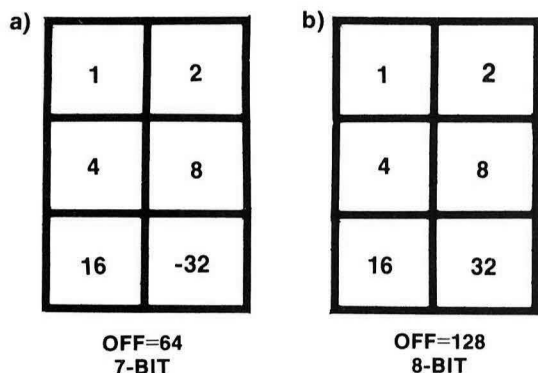
three down. With compressed printing, 132 characters can be printed on a line. This gives a resolution of 264 pixels, which is convenient, as the *PMODE 4* screen has 256 pixels across. Therefore, the full screen width can be printed with a string of 128 graphics characters. Going further, this string can print three rows of hi-res pixels. This means that 64 strings are needed to print the full screen height, 192 pixels.

Now that the screen and printer pixel relationships are established, the next problem is finding the screen pixels. In *PMODE 4*, the computer stores eight pixels in each graphics page byte. Therefore, each row of pixels is stored in 32 bytes. To compile the printing string, 96 bytes must be examined, 32 for each row of the six-block characters.

Lastly, the six-block print code must be formed. The code is the same as the value you would use

with the BASIC CHR\$ function. The value of each six-block pixel is shown in Figure 1 for both the 7-bit and 8-bit printer modes. Remember that the CoCo BASIC 1.0 ROM uses 7-bits for the printer whereas the BASIC 1.1 ROM can use either 7 or 8 bits. The internal printer DIP switch must be set to the appropriate mode.

Now that the mechanics are defined, on with the program. As presented here, the program supports the 7-bit mode. The changes for



Print Code=OFF +Pixel Value

Figure 1. Six-Block Pixel Value



8-bit are given at the end. The code is position independent and can be located anywhere it will not interfere with the graphics pages to be printed. The source code listing starts at \$4000 (ORG \$4000) which is convenient for a 32K machine, ORG \$3000 would be appropriate for a 16K.

Once assembled, the program is loaded using *CLOADM* followed by an *EXEC* command. The program is self-prompting. Since the program ends with an RTS instruction, it can be used as a subroutine for either a BASIC or machine language program. Calling from BASIC requires the *DEFUSR* and *USR* commands.

The following description is by lines. The program was assembled using the TRS EDTASM+ ROM Pak.

80: Starting address of \$4000, change to suit your needs.

100-130: The address of four ROM subroutines. \$A928 clears the text screen and homes the cursor, \$A1C1 gets the key pressed, \$A30A prints to the text screen, \$A2BF prints to the printer.

190-210: Clears the text screen, displays title and requests starting page number.

230-280: The keyboard is polled to get the page number. If valid, the number is stored in multipurpose register COUNT1 as an ASCII value.

300-340: The page number is displayed and the background color is requested.

360-400: The keyboard entry is obtained; if 0, it is stored in BKGND, otherwise 1 is stored. By changing the background color, it is possible to obtain either positive or negative print-outs.

420-460: The background is displayed and the "printer ready" prompt appears.

480-500: After the printer is set-up, it is initialized by the contents of string PRTINT. This string puts the printer on-line, sets compressed printing, sets eight per inch, sets page length to 88 lines, sets top-of-form and lastly advances the paper eight lines.

520-540: The number of lines to be printed, 64, is stored in LINES.

560-620: The first graphics byte is found by initially loading the X-register with \$600. Then for each additional page, \$600 is added to X. The X-register will now keep track of the 6144 bytes required to store the PMODE4 screen.

640-650: The Y-register is loaded with the address of the print string,

```

00010 *****
00020 *PMODE 4 PRINT*
00030 *****
00040 *
00050 *J.KOHN
00060 *10N0V82
00070 *
4000 00080 ORG $4000
00090 *
 A928 00100 CLRSCR EQU $A928 CLEAR SCREEN AND HOME CURSOR
 A1C1 00110 POLCAT EQU $A1C1 KEYBOARD CHARACTER TO REGISTER A
 A30A 00120 PRTSCR EQU $A30A PRINTS CHARACTER IN REGISTER A TO SCREEN
 A2BF 00130 PRTPRT EQU $A2BF PRINTS CHARACTER IN REGISTER A TO PRINTER
00150 *
00160 *WRITTEN IN POSITION INDEPENDENT CODE
00170 *FOR MICROLINE 82A IN 7-BIT MODE
00180 *
4000 BD A928 00190 START JSR CLRSCR PRINT TITLE DISPLAY
4003 30 8D 0175 00200 LEAX TITLE,PCR
4007 17 012B 00210 LBSR SCRPRT
00220 *
400A 17 0132 00230 LBSR GETKEY GET START PAGE
400D 81 36 00240 CMPA #'6
400F 24 EF 00250 BHS START
4011 81 30 00260 CMPA #'0
4013 23 EB 00270 BLS START
4015 A7 8D 02AC 00280 STA COUNT1,PCR PAGE STORED IN COUNT1 AS ASCII
00290 *
4019 BD A928 00300 JSR CLRSCR DISPLAY PAGE NUMBER
401C 30 8D 0199 00310 LEAX PAGPRT,PCR
4020 17 0112 00320 LBSR SCRPRT
4023 A6 8D 029E 00330 LDA COUNT1,PCR
4027 B7 042B 00340 STA $400+43
00350 *
402A 17 0112 00360 LBSR GETKEY GET BACKGROUND COLOR
402D 81 30 00370 CMPA #'0
402F 27 02 00380 BEQ AA
4031 86 31 00390 LDA #'1 SET BACKGROUND TO '1
4033 A7 8D 0293 00400 AA STA BKGND,PCR SET BACKGROUND TO '0
00410 *
4037 BD A928 00420 JSR CLRSCR DISPLAY BACKGROUND
403A 30 8D 01B0 00430 LEAX BKPRT,PCR
403E 17 00F4 00440 LBSR SCRPRT
4041 A6 8D 0285 00450 LDA BKGND,PCR
4045 B7 042B 00460 STA $400+43
00470 *
4048 17 00F4 00480 LBSR GETKEY PROMPT PRINTER
404B 31 8D 01C8 00490 LEAY PRTINT,PCR
404F 17 00F3 00500 LBSR PNTPRT
00510 *
4052 BD A928 00520 JSR CLRSCR
4055 C6 40 00530 LDB #64
4057 E7 8D 026E 00540 STB LINES,PCR
00550 *
405B A6 8D 0266 00560 LDA COUNT1,PCR GET START PMODE BYTE
405F 80 30 00570 SUBA #48 CONVERT FROM ASCII
4061 8E 0600 00580 LDX #0600
4064 4A 00590 FF DECA
4065 27 06 00600 BEQ STSTR
4067 30 89 0600 00610 LEAX #600,X X HAS PMODE BYTE ADDRESS
406B 20 F7 00620 BRA FF
00630 *
406D 31 8D 01C0 00640 STSTR LEAY PRTBLK,PCR Y HAS CHARACTER BYTE ADDRESS
4071 6F 8D 0253 00650 CLR BYTES,PCR
00660 *
4075 C6 40 00670 INIT LDB #64 INITIALIZE CHARACTER BYTES
4077 86 80 00680 LDA #128
4079 E7 A0 00690 XX STB ,Y+
407B 4A 00700 DECA
407C 26 FB 00710 BNE XX
407E 31 8D 01AF 00720 LEAY PRTBLK,PCR

```

```

00730 *
4082 C6 01 00740 LDB #1 TOP CHARACTER ROW CONSTANTS
4084 E7 8D 023D 00750 STB COUNT1,PCR
4088 58 00760 LSLB
4089 E7 8D 0239 00770 STB COUNT2,PCR
00780 *
408D A6 80 00790 STBYT LDA ,X+ GET PHODE BYTE
408F E6 8D 0237 00800 LDB BKGND,PCR
4093 C1 30 00810 CMPB #'0
4095 27 01 00820 BEQ YY
4097 43 00830 COMA COMPLEMENT IF BACKGROUND IS '1
00840 *
4098 17 00CB 00850 YY LBSR PRTCHR
409B 6C 8D 0229 00860 INC BYTES,PCR
409F E6 8D 0225 00870 LDB BYTES,PCR
40A3 C1 60 00880 CMPB #96
40A5 27 2D 00890 BEQ LL
40A7 C1 40 00900 CMPB #64
40A9 22 E2 00910 BHI STBYT
40AB 27 19 00920 BEQ NN
40AD C1 20 00930 CMPB #32
40AF 22 DC 00940 BHI STBYT
40B1 27 02 00950 BEQ QQ
40B3 20 D8 00960 BRA STBYT
00970 *
40B5 C6 04 00980 QQ LDB #4 MIDDLE CHARACTER ROW CONSTANTS
40B7 E7 8D 020A 00990 STB COUNT1,PCR
40BB 58 01000 LSLB
40BC E7 8D 0206 01010 STB COUNT2,PCR
40C0 31 8D 016D 01020 RR LEAY PRTBLK,PCR
40C4 20 C7 01030 BRA STBYT
01040 *
40C6 C6 10 01050 NN LDB #16 BOTTOM CHARACTER ROW CONSTANTS
40CB E7 8D 01F9 01060 STB COUNT1,PCR
40CC C6 E0 01070 LDB #-32
40CE E7 8D 01F4 01080 STB COUNT2,PCR
40D2 20 EC 01090 BRA RR
01100 *
40D4 31 8D 0159 01110 LL LEAY PRTBLK,PCR FIND NON-BLANK CHARACTERS
40D8 6F 8D 01E9 01120 CLR COUNT1,PCR
40DC B6 80 01130 LDA #128
40DE E6 A0 01140 MM LDB ,Y+
40E0 C1 40 01150 CMPB #64
40E2 27 04 01160 BEQ ZZ
40E4 6C 8D 01DD 01170 INC COUNT1,PCR
40E8 4A 00 01180 ZZ DECA
40E9 26 F3 01190 BNE MM
40EB 31 8D 013C 01200 LEAY PRTSTR,PCR PRINT CHARACTER STRING
40EF 8D 54 01210 BSR PNTPRT
40F1 31 8D 013C 01220 LEAY PRTBLK,PCR
40F5 A6 A0 01230 SS LDA ,Y+
40F7 81 40 01240 CMPA #64
40F9 27 04 01250 BEQ PP
40FB 6A 8D 01C6 01260 DEC COUNT1,PCR
40FF 8D A2BF 01270 PP JSR PRTPRT
4102 6D 8D 01BF 01280 TST COUNT1,PCR
4106 26 ED 01290 BNE SS
4108 86 0F 01300 LDA #15
410A 8D A2BF 01310 JSR PRTPRT
410D 86 0D 01320 LDA #13
410F 8D A2BF 01330 JSR PRTPRT
4112 6A 8D 01B3 01340 DEC LINES,PCR SEE IF SCREEN FINISHED
4116 1026 FF53 01350 LBNE STSTR
01360 *
411A 86 0C 01370 LDA #12
411C 8D A2BF 01380 JSR PRTPRT
411F 86 0D 01390 LDA #13
4121 8D A2BF 01400 JSR PRTPRT
4124 30 8D 0189 01410 LEAX REPEAT,PCR PROMPT REPEAT
4128 8D 00 01420 BSR SCRPT
412A 8D 13 01430 BSR BETKEY
412C 81 59 01440 CMPA #'Y
412E 1027 FECE 01450 LBQ START

```

PRTBLK, which is 128 bytes of reserved memory. The BYTES register is cleared. This register will track the number of graphics bytes used for compiling each string.

670-720: PRTBLK is initialized to 64 which is the 'off' or 'no print' state indicated by Figure 1a.

740-770: To prepare for compiling the top pixel row, 1 is loaded into COUNT1 and 2 into COUNT2. These are the constants shown in Figure 1.

790-830: The graphics byte, pointed to by X, is loaded into the A-register, where it is complemented if the background is 1.

850: The byte is translated into six-block weight by PRTCHR (lines 1780-1850). This subroutine in turn uses BYTBIT, which shifts out each bit and uses the appropriate six-block values from COUNT1 and COUNT2. The rest of PRTCHR checks to see if all 8 bits of the graphics byte have been processed.

860-960: The number of bytes processed for the string are checked. If 32, the middle row weights are stored in COUNT1 and COUNT2, then branch back to STBYT. A similar process is done after 64 bytes for the bottom row. After compiling all 96 bytes, the string is complete and almost ready for printing.

1110-1190: To speed up printing, a look-ahead is used. This is simply counting the number of blanks (value 64) in PRTBLK and storing in COUNT1.

1200-1270: Four spaces and the six-block shift-in function, PRTSTR, are sent to the printer. The four spaces center the image. The print string PRTBLK is then sent, while keeping track of the number of blanks sent by decrementing COUNT1.

1280-1330: If the number of blanks sent equals the number in the string, COUNT1 is zero and the line is finished by the six-block shift-out function and carriage return.

1340-1400: LINES is decremented. If less than 64 lines have been printed, a branch is taken back to STSTR for the next line. Otherwise, the printout is finished with a formfeed to the bottom of the page.

1410-1460: The 'repeat' prompt is displayed.

To use the program with the 8-bit printer mode, do the following: change 64 to 128 in lines 670, 1150 and 1240; delete the minus in line 1070.



# Quality Software Is The Number One Priority At K & K COMPUTORS



**LASER TANK** - Pit yourself in a game of strategy and excitement against the computer. You must defend your flag from attacking tanks and destroy them before they destroy your flag or you!!! Only \$15<sup>95</sup>.

**GAZON** - The deadly Gazonians are trying to steal your supplies and you must stop them at all costs. Similar to the popular "RIPOFF" Arcade Game, this game has color and is faster. Machine language. Only \$19<sup>95</sup>.



**MUTATRON** - As the last person alive, you must protect yourself from sadistic robots bent on killing you. Another popular Arcade Game, "ROBOTRON", brought to you by K & K. Machine language. Only \$19<sup>95</sup>.

**SHOOT TO SPELL AND FLASH MATH** - An educational package that helps kids learn to spell and educate them on elementary math. An absolute must for adults with school aged children. Only \$15<sup>95</sup>.

**SPACE HARVEST** - Pilot your spacecraft above the Planetoid Voltar stealing spacefruit and trying to avoid alien guards. Machine language Only \$19<sup>95</sup>.

**SERIAL TO PARELLEL CONVERTER** - Have a printer with a parellel port? Tired of waiting for a line list? With this little hardware device you can make your color computer run at any baud rate between 300 and 9600. Let K & K help your printer to go much faster!!! Only \$67<sup>95</sup>.



**BLACKJACK** - A casino game that puts two players against the beady eyed dealer of the house. This dealer deals the cards as good or even better than Intellivision. If you have any gambling blood at all this game is a must! Same rules as any Las Vegas casino. Only \$15<sup>95</sup>.

**TAPE INDEX** - Trouble keeping track of what programs are on your tape? Now it's possible to place a directory on your cassette. Only \$15<sup>95</sup>



**POLARIS** - You are under the ocean in a submarine, attacking planes and enemy destroyers dropping depth charges attempting to destroy your sub. Can you destroy them before they destroy you? This is a fast action machine language program. Only \$19<sup>95</sup>.



**SUPER ZAP** - Enemy spaceships are attacking from all sides and your mission to defend your starbase from the deadly Armada of Pyrus. This will be a dangerous mission since the Pyrus Armada has never been defeated by any humanoid. Only \$15<sup>95</sup>.

**SKY DESTROY** - Planes and helicopters are coming from all directions, they must be stopped! This game is similar to Atari's and now available to color computer users. Machine language. Only \$19<sup>95</sup>.

**BOWLING SCORED FOR DOLLARS** - Do your leagues bowling averages. This program will keep individual scores, team totals, individual averages, team standings, and print all this information to your line printer. On cassette and disk, specify on order. Only \$19<sup>95</sup>.

**INVENTORY CONTROL** - This program contains all the necessary features required for all types of inventories: sort inventory by stock number, list stock number, description, amount in stock, cost, wholesale, profits. Only \$49<sup>95</sup>.

**CHECK LEDGER** - This bookkeeping system allows the user to have current information on your expenses by any category you wish. Year end tax statements made easy. Disk required. Only \$49<sup>95</sup>.

**ACCOUNTS PAYABLE** - Small businessmen, control your business growth by keeping track of all your cash liabilities and payment history. Only \$49<sup>95</sup>.

**ACCOUNTS RECEIVABLE** - This system keeps track on the status of all customer accounts, all payment histories included. Only \$49<sup>95</sup>.

WE'VE CHANGED OUR NAME: FORMERLY K & K COMPUTORWARE, NOW K & K COMPUTORS.

**ALL GAME PROGRAMS** - require 16K extended (prices are set for cassette, add \$4<sup>00</sup> for disk, except business.)

**PROGRAMMERS!!!** - K & K pays the highest royalties for your programs. If your program is good, send it to K & K

TRS-80 COLOR COMPUTER USERS - New programs are added each week. **SEND \$1<sup>00</sup> FOR OUR COMPLETE CATALOG**



K & K COMPUTORS  
P.O. BOX 833 • STERLING HEIGHTS, MICHIGAN  
48077



Telephone: (313) 264-7345





# TURN YOUR COMPUTER INTO A REAL ARCADE MACHINE! with WICO!



COMMAND CONTROL adaptor Radio Shack® TRS80® Color Computer 17<sup>95</sup>  
Use one or two joysticks - Adaptor needed for all joysticks.

COMMAND CONTROL trackball  
65.95



Famous Red Ball™  
Joystick 15-9730 34<sup>95</sup>



Joystick 15-9714 29<sup>95</sup>  
• Extra-long arcade style

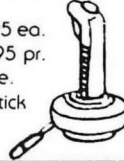


TRIGA-COMMAND JOYSTICKS  
\$19<sup>95</sup> ea/34<sup>95</sup> pr.

POINTMASTER 17<sup>95</sup> ea./32<sup>95</sup> pr.  
A rugged, fast action joystick for those who take their games seriously.



19.95 ea.  
SUPER JOYSTICK CONTROLLER 34.95 pr.  
Retractable cable for easy storage.  
Two FIRE buttons and rotating joystick for fine direction adjustment.



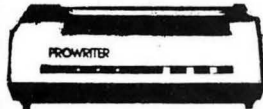
QuickShot™  
DELUXE JOYSTICK CONTROLLER  
• Rubber Suction cup footing  
\$19<sup>95</sup> ea./34<sup>95</sup> pr.



PROGRAM OF THE MONTH!



\$\$\$ NOW ON SALE \$\$\$ Pro/Writer Printer—8510 A



|           | LIST     | SALE     | Package  |
|-----------|----------|----------|----------|
| Printer   | \$495.00 | \$439.95 |          |
| Interface | 69.00    | 65.95    | \$499.95 |

VISA/MC add 3% Ship/handling & insurance add \$10.00

ATARI \$9.50 Each  
or  
2/18.00

COMMODORE \$14.95 Each  
or  
2/24.95

**\$ SPECIAL \$**

## REAL ARCADE ACTION SOFTWARE

### FROM "SHELL"

DEATHSTAR "an adventure" 32k/ecb. \$19.95  
a text adventure thats different!!  
(See review in April Issue of Rainbow)

STAR RAID "arcade type" 16k/ecb... \$18.95  
a lot of action for 16k

FEDERATION BOOTCAMP 16k/ecb... \$18.95  
You've been drafted for 16 wks.  
of rugged training! can you  
become a "space cadet"???

SONAR SEARCH "arcade type" 16/ecb \$18.95  
remember battleship?? you'll  
love this one! 1/2 players

EXTERMINATOR "arcade type" 16k/ecb \$18.95  
not a "centipede type game"  
this is original! destroy  
the insects with your can  
of "RAID" - lots of fun!

SNOOPY & RED BARON "arcade type" \$18.95  
16k/ecb - this one is a real  
"dog" fight for 2 players only!

GRAB 'N' CHASE ..... \$18.95  
A scramble for GOLD! An armored car has  
lost its cargo. Who will find it first?  
The cops or robbers? A 16k/ecb.  
Two player game.

BATTLE STATIONS ..... \$21.95  
A TWO COMPUTER strategy game.  
Two players trade shots from computer  
to computer. NO HARDWARE MODIFICATIONS  
REQUIRED! 16k/32k/ecb.

LUNAR-lander "arcade type" 16k/ecb \$15.95  
yep, another "lander" game but  
we think you'll like our version.  
Different each time with 4 levels  
of play! Great Effects!!

### FROM TOM MIX

DONKEY-KING "arcade type" 32k/ml \$24.95  
by far the best "KONG" type  
game! 4 full screens, just  
like the arcade-ASTOUNDING!!

TRAP FALL ..... \$27.95  
16k/ml. The "PIT FALLS" in this game are  
many. Hidden treasures, swing on vines  
and jump over pits. TOP NOTCH GRAPHICS!

SPACE SHUTTLE ..... \$28.95  
32k Full instrumentation! Actual simulation  
of space flight.

FROG 16k/ml ..... \$27.95  
A realistic rendition of  
the arcade classic!

TAPE TO DISK "utility" 16k/ml ..... \$19.95  
load any tape to disk  
automatically

THE FIXER "utility" 16k ..... \$18.95  
having trouble moving those  
600 hex programs to disk?  
the FIXER will help!

DISK TO TAPE "utility" 16k/ml ..... \$19.95  
dump contents of disk to  
tape automatically

### FROM DATA SOFT

ZAXXON 32k ..... \$39.95  
The official arcade version.

MOON SHUTTLE ..... \$32.95  
A SUPER, HIGH ACTION ARCADE GAME!  
A MUST! 16k/ml

**10% DISCOUNT!**

Mention this ad

And Order By Check Or M/O

\*\*\*IF IT'S NOT GOOD, WE DON'T SELL IT\*\*\*  
DEALER INQUIRIES WELCOME

**S & S ARCADE SUPPLIES**

8301 Samow Dr./Orlando, FL 32807

9 to 5 EST (305) 894-1887 - Evenings (305) 275-8490

USA Orders under \$50 - Add \$2.50  
OTHER Orders Add \$5.00 ship/hnd.  
Fla. Residents add 5% sales tax.  
Visa/MC Add 3%

NO C.O.D. ORDERS

|      |      |         |                                                                                                                                  |
|------|------|---------|----------------------------------------------------------------------------------------------------------------------------------|
| 41B0 | 00   | 02000   | FCB 0                                                                                                                            |
|      |      | 02010 * |                                                                                                                                  |
| 41B9 | 0D   | 02020   | PAGPRT FCB 13                                                                                                                    |
| 41BA | 53   | 02030   | FCC /START PAGE=/<br>54<br>41<br>52<br>54<br>41<br>52<br>54<br>20<br>50<br>41<br>47<br>45<br>30                                  |
| 41C5 | 000D | 02040   | FDB 00D0D                                                                                                                        |
| 41C7 | 0D   | 02050   | FCB 13                                                                                                                           |
| 41C8 | 42   | 02060   | FCC /BACKGROUND (0 OR 1)?/<br>41<br>43<br>4B<br>47<br>52<br>4F<br>55<br>4E<br>44<br>20<br>28<br>30<br>20<br>4F<br>52<br>20<br>31 |

|      |      |         |                                                                                                                  |
|------|------|---------|------------------------------------------------------------------------------------------------------------------|
|      | 29   |         |                                                                                                                  |
|      | 3F   |         |                                                                                                                  |
| 41DC | 0D   | 02070   | FCB 13                                                                                                           |
| 41DD | 30   | 02080   | FCC /0=BLACK/<br>3D<br>42<br>4C<br>41<br>43<br>4B                                                                |
| 41E4 | 0D   | 02090   | FCB 13                                                                                                           |
| 41E5 | 31   | 02100   | FCC /1=BUFF OR GREEN/<br>3D<br>42<br>55<br>46<br>46<br>20<br>4F<br>52<br>20<br>47<br>52<br>45<br>45<br>4E        |
| 41F4 | 0D00 | 02110   | FDB 00D00                                                                                                        |
|      |      | 02120 * |                                                                                                                  |
| 41F6 | 0D   | 02130   | BKPRT FCB 13                                                                                                     |
| 41F7 | 42   | 02140   | FCC /BACKGROUND=/<br>41<br>43<br>4B<br>47<br>52<br>4F<br>55<br>4E<br>44<br>3D                                    |
| 4202 | 0D0D | 02150   | FDB 00D0D                                                                                                        |
| 4204 | 0D   | 02160   | FCB 13                                                                                                           |
| 4205 | 52   | 02170   | FCC /READY PRINTER.../<br>45<br>41<br>44<br>59<br>20<br>50<br>52<br>49<br>4E<br>54<br>45<br>52<br>2E<br>2E<br>2E |
| 4215 | 0000 | 02180   | FDB 00D00                                                                                                        |
|      |      | 02190 * |                                                                                                                  |
| 4217 | 11   | 02200   | PRINT FCB 17                                                                                                     |
| 4218 | 1B   | 02210   | FCB 27                                                                                                           |
| 4219 | 41   | 02220   | FCB 'A                                                                                                           |
| 421A | 1D   | 02230   | FCB 29                                                                                                           |
| 421B | 1B   | 02240   | FCB 27                                                                                                           |
| 421C | 3B   | 02250   | FCB '8                                                                                                           |
| 421D | 0D   | 02260   | FCB 13                                                                                                           |
| 421E | 1B   | 02270   | FCB 27                                                                                                           |
| 421F | 46   | 02280   | FCB 'F                                                                                                           |
| 4220 | 3B   | 02290   | FCB '8                                                                                                           |
| 4221 | 3B   | 02300   | FCB '8                                                                                                           |
| 4222 | 1B   | 02310   | FCB 27                                                                                                           |

# OWL-WARE



**ASSEMBLY LANGUAGE GRAPHICS**  
for the TRS-80 Color Computer  
by **DON & KURT INMAN**

280 pages **\$14.95** + \$1.25 postage & handling

**6809 ASSEMBLY LANGUAGE PROGRAMING** by LEVENTHAL...**\$16.95**

EDTASM+ Radio Shack ROM Pack Assembler **\$40.95**

with purchase of either book (regular price \$49.95)

This is an excellent full featured assembler, monitor and editor. We also are including a write up on procedures for using the book with this assembler.

**SUPER SPECIAL FOR ALL THREE...\$68.50**

Software Authors Wanted-Highest Royalties Paid

**\$1.25 Per Order**  
Postage &  
Handling

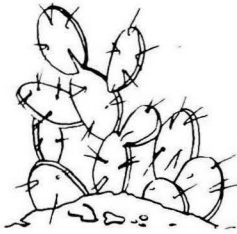
All Orders Receive  
10% Voucher On Order  
PA. Res. Include 6% Tax



**OWL-WARE**  
P.O. Box 116F  
Mertztown, PA.  
19539

**DEALERS INQUIRIES INVITED**



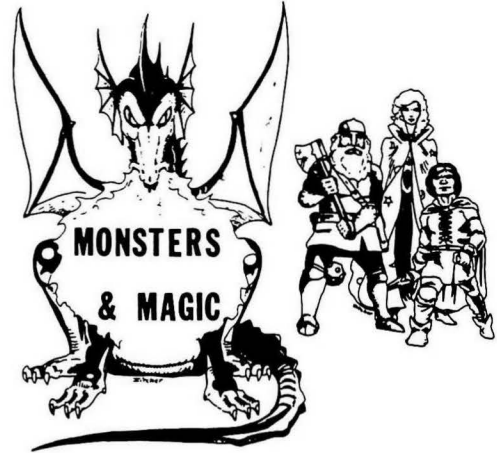
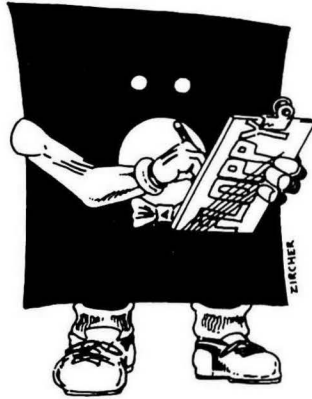


# PRICKLY-PEAR SOFTWARE

## QUALITY PROGRAMS FOR YOUR COCO & TDP-100

PROGRAMS REQUIRE 16K EXTENDED BASIC FOR TAPE, AND 32K DISK UNLESS OTHERWISE NOTED.

### DISK UTILITIES



#### The Disk Manager

If you use a disk drive you **NEED** this program! It does more than any other disk utility. You can use it to rebuild a crashed disk easily - two different ways. You can also print a **SUPER DIRECTORY** for a disk that contains such information as program size, which granules are used, and the start, end, and execute addresses for machine language programs. It will also print a menu on the screen for a disk in the drive, and when you indicate your choice it will load and either **RUN** or **EXEC** the program for you as appropriate. In addition, it codes your files by **DATE**, and it codes your disks by **NAME** and **NUMBER**. And, it creates and maintains a file of all your disks (and the programs on them) which you can sort and print as needed. You can sort a collection of up to 300 disks. Could you use a printed list of **EVERY** program in your collection, in alphabetical order? This list tells you which disk has the program you need so you can find it easily, and all this is only the beginning. There are so many features we have no space to mention them all. Both the 16K and 32K versions are included, and we suggest you place a copy of the program on every diskette for quick access. You will wonder how you got along without this beauty!! Full, easy to follow instructions. Requires a disk drive. **\$29.95**

#### The Disk Master

This helpful addition to your library performs a whole list of great functions. We've seen programs selling for just as much that do only one or two of these things, and the whole thing is menu driven for ease of use. It provides a speed check and adjustment function to get your drives into perfect adjustment. It moves data files from tape to disk — or disk to tape — or programs from one drive to another — all effortlessly. It prints a directory — with machine language addresses — to the screen or printer. It gives you two different disk maps. One shows which sectors are used in each gran, and the other shows which gran are available. It even gives you a way to easily purge a number of files from a crowded disk. Why buy a different program for every function, when this does so much? Requires a disk drive. **\$24.95**

#### Monsters & Magic

The most realistic fantasy role-playing game yet for the Color Computer. You start out by rolling up your character's basic ability scores and buying equipment. When you are ready it's into the dungeon. Your character starts at first level, but can rise in levels by garnering experience in the fray. If you have role-played fantasy games you will be amazed at the realism of the combat system. Armor class, initiative, and damage by weapon type are all included, with over 50 different monsters to fight - each with it's own abilities. As you rise in level you can win treasure and find magic weapons and spells - if you live!! You set the game length by telling how many monsters you want to fight before you reach your final battle to the death against the powerful **Dungeon Lord**. There are 1000+ place description combinations in this text based game, and real excitement in every one! This is a fantasy simulation, and is truly not like any adventure game you have ever seen. For 1 player; requires 32K extended BASIC. **TAPE - \$19.95, DISK - \$24.95**

#### Astrology

Truly a classic, this program will accurately cast your complete horoscope. You just enter the date, time, and place of birth. The sun sign, rising sign, mid heaven (MC), lunar nodes, and planetary influences including houses and aspects between the planets will all be calculated, and a full chart drawn. You can also do progressed charts and transits. It will even tell you the day of the week you were born. The accompanying book will help you interpret this chart of your horoscope. The extent of the documentation is tremendous, even by our exceptionally high standards, and no previous knowledge of the subject is required. You can share in this wisdom which has been used for thousands of years in many cultures. This program was written by a professional Astrologer. Please specify 16K or 32K system. **\$34.95 tape — \$39.95 disk**

FOR DISK VERSIONS ON AMDEK CARTRIDGES, ADD \$5.

Your Personal check is welcome - no delay. Include \$1.50 shipping for each program ordered. (Shipping free on \$50.00 or larger orders). Az. residents add 6% sales tax. Orders shipped within two days.

Stocked by Quality Dealers, or

Send Order To: **PRICKLY-PEAR SOFTWARE**  
9234 E. 30th Street  
Tucson, Arizona 85710  
(602) 886-1505

```

4223 35 02320 FCB '5
4224 0D 02330 FCB 13
4225 1B 02340 FCB 27
4226 0B 02350 FCB 11
4227 30 02360 FCB '0
4228 38 02370 FCB '8
4229 0D 02380 FCB 13
422A 00 02390 FCB 0
 02400 *
422B 2020 02410 PRTSTR FDB $2020
422D 2020 02420 FDB $2020
422F 0E00 02430 FDB $0E00
4231 02440 PRTBLK RMB 128 4 CHARACTERS/BYTE
 02450 *
42B1 0D0D 02460 REPEAT FDB $0D0D
42B3 52 02470 FCC /REPEAT (Y OR N)?/
 45
 50
 45
 41
 54
 20
 28
 59
 20
 4F
 52
 20
 4E
 29
 3F
42C3 0D00 02480 FDB $0D00
 02490 *
 02500 *

```

```

02510 *
02520 *
02530 *
02540 *USER REGISTERS
02550 *
42C5 00 02560 COUNT1 FCB 0
42C6 00 02570 COUNT2 FCB 0
42C7 00 02580 BITS FCB 0
42C8 00 02590 BYTES FCB 0
42C9 00 02600 LINES FCB 0
42CA 00 02610 BKGND FCB 0
 0000 02620 END
00000 TOTAL ERRORS

```

BACKGROUND IN ASCII

```

AA 4033
BB 413E
BITS 42C7
BKGND 42CA
BKPR 41F6
BYTBIT 414F
BYTES 42C8
CLRSCR A920
COUNT1 42C5
COUNT2 42C6
DD 414E
EE 416A
FF 4064
GETKEY 413F
GG 415A
HH 4165
INIT 4075
LINES 42C9
LL 40D4
MM 40DE
NN 40C6
PAGPRT 41B9
PNTPRT 4145
POLCAT A1C1
PP 40FF
PRTBLK 4231
PRTCHR 4166
PRTINT 4217
PRTPRT A2BF
PRTSCR A30A
PRTSTR 422B
QQ 40B5
REPEAT 42B1
RR 40C0
SCRPR 4135
SS 40F5
START 4000
STBYT 400D
STSTR 406D
TITLE 417C
XX 4079
YY 4098
ZZ 40E8

```

# DRAW-IT

Requires 16K-Ext.BASIC,cassette.

Draw and erase lines, circles, boxes, and vectors.

Alphabetically coded keyboard control, with sound cues.

Hi-Resolution, 256x192.

On-Screen cursor, with variable jump rate.

Paint function, can be used to produce negative graphics.

Tape storage of graphics screen, change taped graphics.

\$15.00

J P S

11462 Columbus Ave.,W.  
Fostoria, OH, 44830

## Hint

Here's an easy way to end many tape I/O errors. Position tape where program is to be saved. Then press play and record, and type in *MOTOR ON*. Estimate the length of your program, add a few seconds more, and type *MOTOR OFF*. Rewind to original position, and save in normal way.

This will erase any unwanted junk on the tape, thus allowing a clean saving process.



# - COMPUTER SHACK -

## COLOR DFT (Direct File Transfer) Disk or Tape

At last a terminal program for the color computer that allows you to send and receive machine language programs without any conversion routines. Send directly from disk to disk or tape to disk. DFT will send and receive any type of program machine language, basic, text files, data files etc. from a color computer, Model I, Model III or a Bullet 80 system. DFT has a chat mode and has software controlled half and/or full duplex. You must have a modem in order to use DFT.

Tape Version ..... \$24.95 Disk Version ..... \$29.95

## COLOR TAPE COPY \$15.95

By Bob Withers

There have been few copy programs on the market for the Color computer but none can compare with Color Tape Copy. This program is designed so that you don't lose any of your valuable programs or data bases.

It will make a backup of any Color Computer Tape; Machine language, data, or basic program.

First load color tape copy into your CC. Then it prompts you to put your original copy into the recorder. After it loads the program into memory it tells you to put a blank tape into the recorder and press the record button. It then writes the program to a new tape.

You'll never have to worry about your little kids destroying your \$20.00 tapes. 16K.

## TELEWRITER - 64

Best word processor for the Color Computer.

Tape ..... \$49.95 Disk ..... \$59.95

## COMPUTER SHACK COLOR COMPUTER TOP TEN PLUS 3

1. THE KING ..... Tom Mix
2. COLORPEDE ..... Intra Color
3. TRAPFALL ..... Tom Mix
4. BLOC HEAK ..... ComputerWare
5. ZAXXON ..... DataSoft
6. ROBOTACK ..... IntraColor
7. ASTROBLAST ..... Mark Data
8. ZAKSUND ..... Elite
9. PLANET INVASION ..... Spectral
10. DOODLE BUG ..... ComputerWare
11. THE FROG ..... Tom Mix
12. SPACE RACE ..... Spectral
13. GRAND PRIX ..... ComputerWare

## COMPUTER SHACK'S BOOK STORE

### PROGRAMMING THE 6809

By Rodney Zaks & William Labiak

\$14.95

This book explains how to program the 6809 in assembly language, covering all aspects progressively and systematically. Beginning with the basics of programming, **Programming the 6809** goes on to explain registers and buses, subroutines, the 6809 instruction set, addressing modes, I/O techniques and devices, and finally, data structures. With this knowledge you will be able to give your 6809 processor 16-bit performance with 8-bit economy. No prior programming knowledge is required.

### TRS-80 COLOR PROGRAMS

by Tom Rugg and Phil Feldman

\$19.95

Here are 37 fully documented programs ready to type into your color computer. These programs promise to be educational, practical, and in almost all cases, fun. 332 pages.

### COLOR COMPUTER GRAPHICS

by Ron Clark

\$9.95

The complete handbook on how to do color video graphics, with ready to run programs. Learn all about low, medium and high-resolution graphics, and how to create each. 138 pages.

### TRS-80 COLOR BASIC

by Bob Albrecht

\$9.95

With this book you can teach yourself BASIC, the language of the TRS-80 and many other computers. Packed with games, experiments, programming problems and solutions, this entertaining self-instructional book is the ideal introductory aid for kids, parents and teachers. 378 pages.

### TRS-80 COLOR COMPUTER GRAPHICS

by Don Inman

\$14.95

Explore the creative and imaginative blending of computers and color using Color Computer Graphics. This book will enable you to explore all the graphics capabilities of Extended Basic. you will learn how to create interesting graphics to enhance your own computer programs. The book also provides application programs and useful subroutines. 303 pages

### COLOR COMPUTER SONGBOOK

by Ron Clark

\$7.95

40 of the world's best known songs, scored for easy playing on the TRS-80 Color Computer, including many favorite popular, classical, folk and seasonal musical selections. Some of which include Dixie, Minuet, Greensleeves, Jingle Bells, Yellow Rose of Texas, etc. 96 pages

## COMPUTER SHACK

1691 Eason • Pontiac, Michigan 48054

Info: (313) 673-8700 • Orders: CALL TOLL FREE (800) 392-8881

Master Charge and VISA OK. Please add \$3.00 for shipping in the U.S.A. - \$5.00 for Canada or Mexico - Proper postage outside of U.S. - Canada - Mexico.  
Dealers: We are distributors for all items in this ad. Write for our catalog and price list.

## PROWRITERS NOW ONLY \$399.95

Now the #1 selling low priced dot matrix is even lower priced. The Prowriter with its 1 year guarantee, proportional spacing, 120 CPS printing, and excellent quality is only \$399.95 with a certified check. All other forms of payment \$429.95. This includes our special book on using the Prowriter with the TRS-80 (NOTE: Color Computer users an additional \$69.95 gives you all the cables and converters you need.)

### COLOR COMPUTER SOFTWARE

(NOTE: Prices are listed Tape/Disk)

#### AARDVARK

- WIZARDS TOWER ..... 14.95/16.95
- GOLF ..... 9.95
- HAUNTED HOUSE ..... 9.95/11.95
- DUNGEONS OF DEATH... 14.95/19.95
- VENTURER ..... 19.95
- QUEST ..... 14.95/16.95

#### ANTECO

- INTERGALACTIC ..... 24.95/32.95

#### COGNITEC

- TELEWRITER-64 ..... 49.95/59.95

#### COMPUTER SHACK

- COLOR TAPE COPY ..... 15.95
- COLOR DFT TAPE ..... 24.95
- COLOR DFT DISK ..... 29.95

#### COMPUTERWARE

- DOODLE BUG ..... 24.95/29.95
- MOON HOOPER 32K... 24.95/29.95
- GRAN PRIX 32K..... 21.95/26.95
- NERULE FORCE ..... 24.95/29.95
- BLOC HEAD ..... 26.95/29.95
- SHARK TREASURE..... 21.95/25.95
- SCREEN EXPANDER 64K... 24.95/29.95
- MEGAPEDA ..... 21.95/25.95
- PAC ATTACK ..... 24.95/29.95
- RAIL RUNNER ..... 21.95/26.95
- SYNTHET-7 ..... 21.95/26.95

#### CORNISOFT

- SCARFMAN 4K ..... 15.95

#### DATASOFT

- ZAXXON 32K ..... 39.95/39.95
- MOON SHUTTLE 32K ..... 29.95

#### ELITE SOFTWARE

- ZAKSUND ..... 24.95/27.95

#### GAMESTER

- MADAM ROSA'S ..... 15.00
- WET T-SHIRT CONTEST ..... 15.00

#### INTELLECTRONICS

- STARFIRE ..... 21.95/25.95

#### INTRACOLOR

- ROBOTTACK ..... 24.95/27.95
- COLORPEDE ..... 29.95/34.95

#### MARK DATA

- HAYWIRE ..... 24.95/29.95
- CALIXTO ISLAND ..... 19.95
- SPACE RAIDERS ..... 24.95/29.95
- GLAXXONS ..... 24.95/29.95
- CAVE HUNTER ..... 24.95/29.95
- ASTRO BLAST ..... 24.95/29.95
- BLACK SANCTUM ..... 19.95

#### MED SYSTEMS

- PHANTOM SLAYER ..... 19.95
- MONKEY KONG ..... 24.95
- INVADERS REVENGE ..... 19.95

#### MICRO WORKS

- EDITOR ASSEMBLER... 89.95/99.95

#### NELSON SOFTWARE

- SUPER COLOR CALC... 89.95/99.95
- SUPER COLOR WRITER II... 69.95/99.95
- SUPER COLOR TERM ... 49.95/69.95

#### PROGRAMMERS GUILD

- NINJA WARRIOR ..... 24.95
- PACDROIDS ..... 19.95

#### SOFT SECTOR

- ELECTRONIC TYPING TUTOR ... 19.95
- MASTER CONTROL II ... 19.95/24.95
- BONANZA ..... 49.95
- COLOR GRAPHICS EDITOR... 19.95
- TAPE DIRECTORY ..... 14.95

#### SPECTRAL

- SPACE INVADERS ..... 21.95
- SPACE RACE ..... 21.95/25.95
- PLANET INVASION ..... 21.95/25.95
- DISASSEMBLER ..... 14.95
- SOUND SOURCE ..... 24.95
- GALAX ATTACK ..... 21.95/25.95
- GHOST GOBBLER ..... 21.95/25.95
- DEFENSE 16/32K ..... 21.95/25.95
- BUGOUT ..... 19.95
- ALPHA SEARCH ..... 12.95/16.95
- MAGIC BOX ..... 24.95

#### TOM MIX

- WORD DRILL 16K EXT ..... 19.95
- COLORMON ..... 24.95
- TEACHERS Database 32K... 39.95/42.95
- TAPE TO DISK ..... 17.95
- DISK TO TAPE ..... 17.95
- TRAPFALL ..... 27.95/30.95
- YAHTZEE ..... 19.95
- MATH DRILL 16K EXT ..... 19.95
- KATERPILLAR ..... 21.95/24.95
- THE FROG ..... 27.95/30.95
- FIXER ..... 18.95
- SPACE SHUTTLE 32K ..... 28.95
- PROTECTORS ..... 24.95/29.95
- SPELL TEST 16K ext ..... 19.95
- DONKEY KING 32K ..... 26.95/29.95

#### TRANS TEC

- C.C. CALC ..... 24.95
- C.C. WRITER ..... 29.95
- C.C. MAILER ..... 19.95
- C.C. FILE ..... 7.00

regular basis. If so, we would have to increase prices a little (the record is very expensive). So, I'd like to know whether you think it would be worth a price increase. If there is one, we would probably go with a "longer" record, one which would contain more programs. Do, please, follow the instructions carefully in interfacing the programs on the record to your CoCo.

There are some other neat things in here this month, too. I don't want to steal Jim Reed's thunder from his preview of the issue, but I would like to answer one question someone asked me at RAINBOWfest. The question was, "How do you come up with so much for everyone each month?"

The answer is pretty simple: We are by far the largest Color Computer magazine, both in terms of circulation (now over 50,000 paid) and in terms of pages. You've heard me say that we appreciate your mentioning us when you order or make inquiry about products advertised in these pages, and, from what our advertisers say, you do. We thank you for that—but thank yourselves as well. As long as we continue to be the leader in the field, we can continue to expand—offering more programs, more information and more features than anyone else. Last month's *Rainbow* weighed well over a pound. That's a lot of material but, after all, CoCo is a lot of computer.

A year ago this time, I wrote about a whole lot of people who helped us grow. The list, too, has grown. We were 64 pages last July and this month we should be right at or over 300. That sure doesn't happen by magic.

Right here at home, it would never have been possible without Pat Hirsch. Pat is Mrs. Everything around here. I'm proud she's a part of it all.

Ivanka Kleier, "Mrs. Ivanka," and her staff of Tanya Holder and Deidra Henry, make the subscriptions work. Even the day we had 465 new subscribers hit the mailbox at once didn't daunt this crew. They are efficiency personified. And, similarly, Monica Wheat, who gets things out when they should be. That's grown to be a pretty big job—and Monica does it well.

All that pretty stuff you see in *the Rainbow* comes from the talent of Sally Nichols and Jerry McKiernan, with some help from Meri May. But, more than that, they also get things together—and if you don't think laying out 300-some pages every month is a massive job, please think again. And

# COMPUTER SHACK

1691 Eason • Pontiac, Michigan 48054

Info: (313) 673-8700 • Orders: CALL TOLL FREE (800) 392-8881

Master Charge and VISA OK. Please add \$3.00 for shipping in the U.S.A. - \$5.00 for Canada or Mexico - Proper postage outside of U.S. - Canada - Mexico

Dealers: We are distributors for all items in this ad. Write for our catalog and price list. We are not responsible for typographical errors. Prices subject to change without notice



# -COMPUTER SHACK-

At Computer Shack we ship out over 90% of our orders within 24 hours. We will also give you a discount if you order more than one program. 10% if you order 2, 15% if you order 3 and 20% if you order 4 or more programs (any software).

## QUICK SHOT JOYSTICKS

We have tested many joysticks in the last few months and we feel that we have found a winner in the new QuickShot joystick by Spectravision. It has a contour design that fits comfortably around your palm. You can play for hours without developing a case of sore thumb. It has two fire buttons one on the base, and one on the handle for that extra margin of speed. It has four suction cups on the base and comes with a long cord. The best part of it is that it is only **\$14.95**. This is an Atari compatible joystick and must have a converter. Atari type joysticks work well with most games but there are some they won't work on. For these we recommend the Kraft joystick.



**WICO CONVERTER** - Converts two Atari type joysticks to the COCO for only **\$17.95**

## KRAFT JOYSTICK

For those that want a full analog joystick we recommend the Kraft joystick. This stick is light enough to be held in your hand yet strong enough to be guaranteed for a full year. This is my favorite joystick. List price is \$64.95 but we sell them for only **\$49.95**.

## OTHER JOYSTICKS!

- Wico Red Ball..... **\$34.95**
- Wico Arcade joysticks..... **\$29.95**
- Wico Analog joystick..... **\$44.95**

## NEED 64K?

Notice that all the better new games are 32K? Well don't despair; for only **\$69.95** you can install 64K in your COCO. Its easy. I did it in less than 20 minutes with no problems. All you need is a screwdriver, sidecutters, and a soldering iron (you have to solder two wires together...Easy). Complete directions included.

## ★★★★★★ PRINTER SPECIAL ★★★★★★

Super Special offer on the best selling printer in America. The Prowriter from Leading Edge. This outstanding printer has the best looking print on any printer under \$500. Along with this it has a correspondence mode, regular mode, elete or pica, double sized or compressed print, proportional spacing, friction or pin feed, etc, etc.. List price on this printer is \$750. At Computer Shack we have been selling them at a discount price of **\$429.00** or even a low low price of **\$399.95** if you send us a certified check with your order. To use with a Color Computer you must have a converter and we recommend the BOTEK for only **\$69.95**.

## ----- SPECIAL COUPON -----

**Special Offer - Free box of paper with each printer sold. Super Fine quality paper 3,200 sheets of laser cut removable perforations, all white 8 1/2 X 11 paper. Our regular \$39.95 a box.**

# COMPUTER SHACK

1691 Eason • Pontiac, Michigan 48054

Info: (313) 673-8700 • Orders: CALL TOLL FREE (800) 392-8881

Master Charge and VISA OK Please add \$3.00 for shipping in the USA - \$5.00 for Canada or Mexico - Proper postage outside of U.S. - Canada - Mexico

Dealers: We are distributors for all items in this ad. Write for our catalog and price list. We are not responsible for typographical errors. Prices subject to change without notice.

hey, you folks are lucky, you have *Rainbow On Tape*. But every word in this magazine has to be typed by Suzanne Kurowsky and Valarie Edwards. That's a big job!

Your first contact with *the Rainbow*, whether you call, write or walk right in, is likely to be Penny Tabor, our receptionist, and she makes those first impressions count. Keeping count of the avalanche of program and article submissions, our product reviews and *Rainbow Scoreboard* is Jutta Kapfhammer, who keeps her desk amazingly straight despite the ton of material that crosses it.

Donna Shuck keeps the books straight. No easy feat at all. Donna is sort of new to *the Rainbow*, but she's worth her weight in pizza.

Wry Courtney Noe and Jim "J.R." Reed are the backbone of the editorial operation. They have various nicknames —from the "Dynamic Duo" to the "Odd Couple." What both are is indispensable. Period.

Willo, Wendy and Laurie—long-suffering family. Thank you for putting up with all of this. To say that it has been interesting would probably be an understatement. But, for all the nights when I had to work, for all the weekends when I just went in "for an hour," for the parties I didn't go to and the driving I couldn't do, thanks for understanding.

When you get involved with something like this, you make a lot of friends. Our contributing editors are not just associates, they are friends, too. So, thank you Bob Albrecht, Steve (and Cheryl) Blyn, Don Inman, Joe Kolar, Dennis (and Rose) Lewandowski, Charlie Roslund, Tony DiStefano, Bill (and Sara) Nolan and Dick White. A great bunch of people.

There really are so many people who are part of the CoCo Community: Paul Rosen, Sue and Paul Searby, John Fraysee, Fred Crawford, Ron and Mona Krebs, Ted Donhauser, Robert Frowenfeld, Dick Hatcher, Bill Vergona, Dave Lagerquist, Dan Downard and the "Green People," Frank Brandon, Jack Torres, Gordon Monnier, Geoff Wells, Tom Delker, Ira Bass, John Waclo, Guy Endicott, Jay Hoggins, Fred Scerbo, Sandy Trevor, Roger Schrag, Ted Hasenstaub, Larry Preble, Tom Scott, Tom Mix, John and Linda Nielson, Paul Nanos, Dan and Tom Nelson, Kathy Goebel, Wayne Diercks, Vic Andrews, Arnold Weiss, Pete Stark, Sue and Gary Davis, Bill Dye, Ed Pollard, Tom Rosenbaum, Jan Zucker, John Boals, Don Dollberg, Tom Kelly, the Delbourgo family,

Harold Berkeley, Frank Hogg and others truly too numerous to mention, such as all our reader reviewers who write for *the Rainbow* each month.

Oh, the three who once got on CompuServe and decided someone should write up some notes on the Color Computer. That's how *the Rainbow* was born. What a thrill to have all three of those "first friends" at RAINBOWfest: Bob Rosen, Joe Bennett and Jorge Mir!

## GOLDLABEL™ BLANK CASSETTES

★ PREMIUM 5 SCREW SHELL  
★ COMPUTER DATA QUALITY ★ LOW NOISE  
★ MADE IN USA ★ GUARANTEED

1 DOZEN C-10 LENGTH \$8.50 + \$2.50 shpg.  
2 DOZEN C-10 LENGTH \$16.00 + \$3.50 shpg.

1 DOZEN C-30 LENGTH \$12.50 + \$2.50 shpg.  
2 DOZEN C-30 LENGTH \$23.50 + \$3.50 shpg.

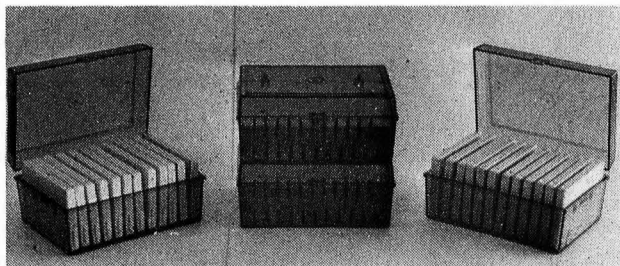
Individual storage boxes (sold only with cassettes) \$2.40 per dozen.  
CASSETTE CADDY: \$3.95 + \$2.00 shpg.  
2 for \$7.00 + \$3.00 shpg.

Free shipping on one caddy with each dozen cassettes.

Foreign orders include shipping at 16 oz. per dozen tapes/9 oz. per caddy/13 oz. per dozen boxes. Shipped in U.S. by UPS.

### CASSETTE CADDY

TIRED OF MISPLACED TAPES AND A CLUTTERED WORK AREA? TRY OUR HINGED TOP SMOKED PLASTIC CADDY THAT HOLDS 12 TAPES IN ONE HANDY LOCATION. EDGE LABELS INCLUDED TO IDENTIFY TAPES.



Visa and Mastercard accepted (include expiration date) Orders paid by cashier's check, money order or bankcard are shipped within 48 hours. Personal check takes 1-2 wks. No COD. Some foreign sales are restricted. Texas residents add 5% tax.

**COLOR SOFTWARE SERVICES**  
P.O. BOX 1708, DEPT. R  
GREENVILLE, TEXAS 75401

Telephone Orders: (214) 454-3674 9-4 Monday-Saturday

★ DEALER INQUIRIES INVITED ★ QUANTITY DISCOUNTS AVAILABLE

And, in all of this, I must inject a note of sadness for one person I never had the pleasure of meeting. Arnold Pouch, who left us this past year, would, I know, have been among those at RAINBOWfest and would have shared the joy and CoCo Community to its utmost.

It would be wholly inappropriate to write thanks without thanking those who *really* made all this possible—the fine folks at Radio Shack who are the guiding hands behind the Color Computer. To Jon Shirley, Ed Juge and Barry Thompson, a large measure of thanks from thousands of us who deeply appreciate your creating and supporting the best computer available at the most attractive price anywhere.

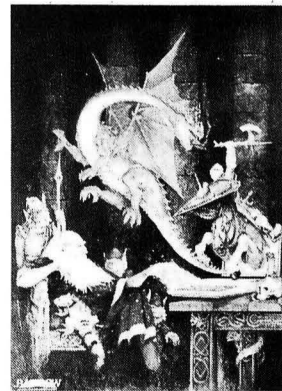
Last and certainly not least: Each of you. Your support for *the Rainbow* has been tremendous, your devotion and suggestions, your letters and cards, your phone calls and your willingness to be a part of the CoCo Community has been, by far, the most heartening and the most important of all.

Thank you for sharing with us and thank you for allowing us to be a part of your lives. We look forward to your continued interest, sharing and support for our CoCo Community in the years ahead.

—Lonnie Falk



## RAINBOW POSTER NOW AVAILABLE



Yes, it's here! A beautiful full-color poster of the cover of our January issue!

This big (31x23) poster is printed on heavy poster paper and varnished to make it really shine. It is the perfect addition to your computer room and is available for only \$5. There's even a small Rainbow logo in one corner.

Send for yours today! There is only a limited supply, and when we run out, there won't be any more.

Each poster is \$5, plus \$1.50 handling charge per order to same address in U.S. and Canada. Other points add \$3. U.S. Currency only. VISA, MasterCard and American Express accepted. Mail to: Rainbow Poster, P.O. Box 209, Prospect, KY 40059 or call (502) 228-4492.





# A CHEAP TALKER FOR OUR COCO

By John R. Kelty

With a device I call the *Cheap Talker*, you can get your CoCo to talk. *Cheap Talker* is simply a cartridge that plugs into the CoCo "expansion" slot and allows you to program speech that will come from your TV speaker. This is not a ROM or a software generated speech system. It is a hardware circuit based primarily on an integrated circuit (IC) called the Votrax SC-01 Speech Synthesizer. Unfortunately, the cost of this chip is still high (the Micromint sells them for \$50 in single quantities), but keeps coming down (they were \$75 only six months ago). The rest of the components might cost you \$20 to \$30 depending on your construction. The *Cheap Talker* requires only two ICs and a transistor with a few resistors and capacitors placed on an edge connector type circuit board. You can use any of several experimenter type circuit boards such as the new Radio Shack catalog number 276-163, but a printed circuit board is available. The software is simply a BASIC program and is stored on cassette. Just plug in the cartridge, turn on the computer, load and run the program, and listen to your TV say "I am the Color Computer Talker" followed by the ABCs.

The Votrax (Votrax is a division of Federal Screw Works) SC-01 speech synthesizer is the descendent of a complicated multiboard circuit costing several thousands of dollars only 10 years ago. The new CMOS IC represents a good mixture of analog and digital circuitry and is easily interfaced to just about any computer. In fact, one of the projects that I have about halfway finished is a talking bulletin board, the size of a picture frame, using the Timex Sinclair Computer. After trying to figure some of the things going on in there, I give Radio Shack four stars for the design and support of the CoCo! In any case, the Votrax IC is complicated but easy to use.

Some of the features of the Votrax SC-01 include 64 programming input codes (6 bits), four programmable pitch levels (2 bits), provisions for manually adjusting the pitch, TTL compatible inputs, strobe and acknowledge handshaking lines, and easy analog output drive connections. Of the 64 programming codes, 61 are actually *phonemes*, two are

different durations of "no sound," and one is a Stop code. Speech is synthesized using phonemes to build words (such as T-AW-K-ER for "talker" with a Midwest drawl). The IC is a 22-pin plastic DIP and I have handled them without any problems due to static electricity, etc. Good things do come in small packages!

The only other IC required for this project is a peripheral interface adapter (PIA). I chose the Motorola 6821PIA for several reasons, including cost, relative ease of programming, durability and familiarity. Since the 6821PIA (and now the 6822 CMOS look alike) are included in the design of

---

*"The Votrax . . . SC-01 speech synthesizer is the descendant of a complicated multiboard circuit costing several thousands of dollars only 10 years ago."*

---

the Radio Shack Color Computer, I also thought it might be the best choice for most CoCo users. Other interface chips are certainly available. I have used the 6522VIA (Versatile Interface Adapter) and the 8255PPI (Programmable Peripheral Interface) successfully in a similar design to the one given here. Incidentally, the 6522VIA is a very popular IC that you will find in PET and VIC computers, among others.

The Votrax SC-01 is powered with 12 VDC in this circuit. The phonemes are programmed into the SC-01 with 6-bit codes from the 6821 port A. The inflection lines are also from port A, so that port A of the 6821 is always used as an output. When I was first experimenting with these inflection outputs, I simply did not use them and connected them to ground. I then used a 7416 open collector TTL buffer (see figure) since I was not sure of the inflection input compatibility with TTL levels. I now have them connected directly to the 6821 port A lines (and have also successfully connected them directly to other PIA outputs) with no problems. Since the 6821 Chip Select (pin 23, CS2\*) is connected to the

---

*(Mr. Kelty is the Electronics Shop Supervisor for the University of Nebraska-Lincoln Department of Physics and Astronomy and holds a master's degree in electrical engineering.)*

CoCo SCS\* (connector pin 36), the four register addresses of the 6821 will be:

- 65344 Port A and Port A data direction register
- 65345 Control Register A
- 65346 Port B and Port B data direction register
- 65347 Control Register B

Port B, CB1, and CB2 are not used. I set A=65344 and count from there in the program. The 6821 initialization is detailed below:

- POKE* A+1,0 Control reg sets up register A as a data direction register
- POKE* A,255 Port A data direction set for all 8 bits as outputs
- POKE* A+1,52 Reset reg A as port A and use CA1 and CA2 as control lines

Similarly, the 6821s of the CoCo are programmed (addresses 65821 through 65823 and 65312 through 65315) to enable the CoCo sound multiplexer input from the cartridge.

The two control lines from the 6821 PIA provide the necessary handshake with the SC-01 for continuous speech. The rising edge of the Strobe (STB) latches the six-bit phoneme data code. The data and strobe lines are directly connected to the 6821 since they are TTL compatible. The Acknowledge/Request (A/R) is essentially a CMOS output and is buffered with a simple transistor circuit. Note that this transistor inverts the logic of the original A/R output. When the SC-01 A/R signal goes from low to high (6821 input goes from high to low due to the transistor inversion), the old

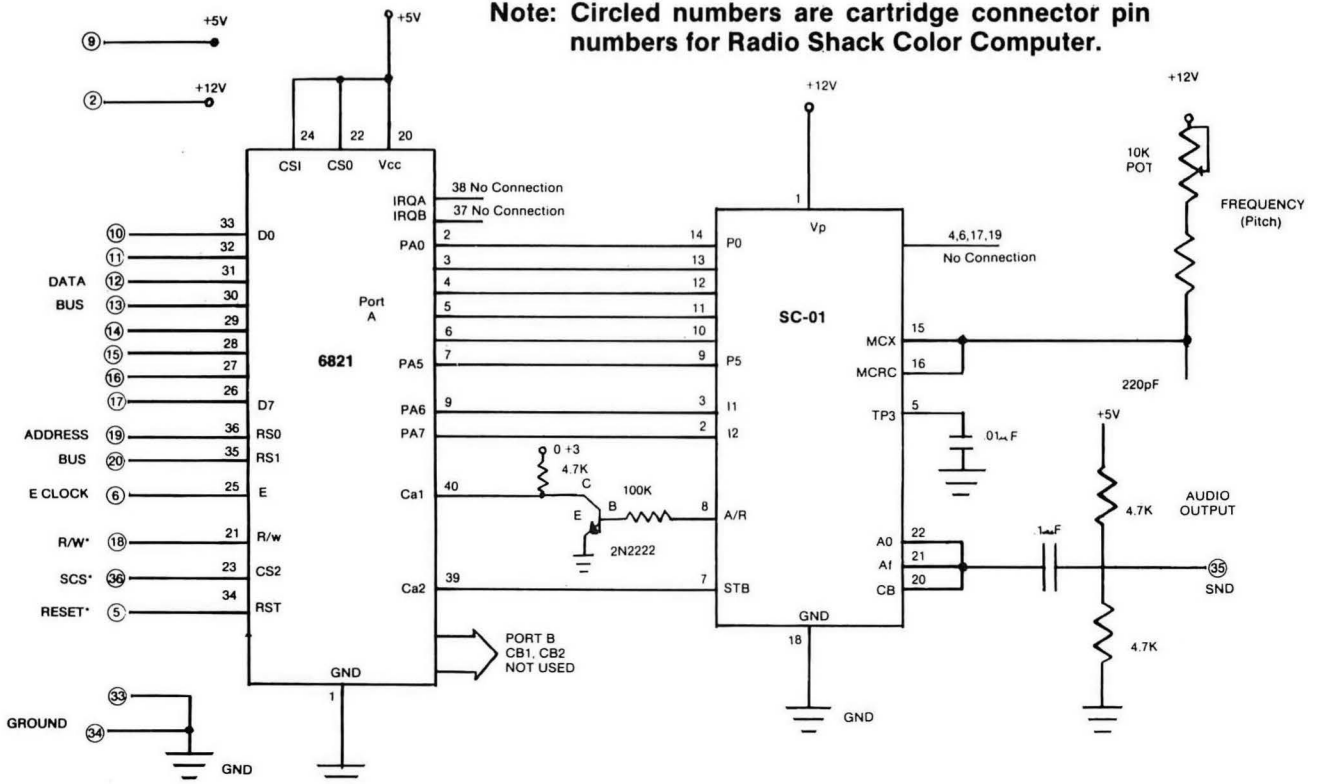
phoneme has timed out and a new phoneme data code may be latched into the SC-01.

The audio output is fed through the cartridge sound pin (35) to the Color Computer and out to your TV. The sound multiplexer IC in the CoCo is selected during the initialization. The output voltage from the SC-01 should be a maximum of approximately 3 Volts peak-to-peak for the AH phoneme and is sufficiently large enough for good volume control. The sound input to the CoCo should not exceed 5 Volts peak-to-peak in case you want to add a gain control amplifier (I have used a 741 op-amp but find it unnecessary. Remember that the volume can be controlled at your TV set!). An amplifier such as the LM386 might easily be added if a separate external speaker is desired, but I have not tested this.

The BASIC program sets up the 6821PIA, selects the cartridge sound input, and then outputs a Stop code (63) to the SC-01 (to keep it quiet). Then the sign-on message is read (and spoken) leaving the user to create speech with phonemes, separated by commas or spaces, in a string. Since this program is intended only for demonstration and experimentation, a string of phonemes should be long enough to say a few words and test the *Cheap Talker*. Vary the frequency control to manually change the voice pitch and if you connected the inflection inputs, IN0 through IN3 will add the proper bit values to port A so that you can program the four internal voice pitch levels.

I am working on a text-to-speech algorithm and writing a BASIC program for this (a machine language version would be nice, but will have to wait). It is not an easy task. It is easy, however, to generate phrases using data statements similar to those used for my sign-on message. A table of the alphabet with a few common words that may prove useful is provided. My two-year old daughter easily recites the ABCs

**Note: Circled numbers are cartridge connector pin numbers for Radio Shack Color Computer.**



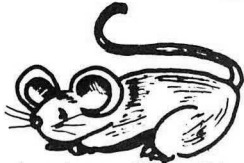


## CLOCK

From B5 Software

A small mouse keeps points to the tune of Hickory Dickory Dock! Helps children K-4th grade practice telling time by using a large graphic clock with synchronized moving hands. Four skill levels: hour, quarter hour, five minute and one minute intervals. Options include reading hours and minutes separately. It's time to learn!

26727 16K Extended  
Basic Tape \$24.95



## ZAXXON

from DataSoft

The official Zaxxon, now for home use, combines 3 dimensional effects, unique color graphics and realistic sound effects. Arcade action while you maneuver your ship through a battlefield of enemy missiles, tanks and planes to meet your match in the deadly Zaxxon Robot armed with a lethal homing device.

35963 32K Tape  
or Disk \$39.95



## VOYAGER I

from Avalon Hill

You're on board a spaceship infested with killer robots in this graphic science fiction game. You must clear the 4-level 144-location ship of robots and arm it to self-destruct. Can you do it and escape before you, too, are blown up? High-speed graphics are represented in 3-D perspective representing your eye's view; with instant switching to floor plan maps. Extended BASIC required.

29012 16K Tape \$19.95



## MONEY

From B5 Software

Pay your fare and ride to the moon! Five skill levels from counting dimes, nickels and pennies to combinations of more than a dollar using graphic coins. If correct answer is given for a series of three, the rocket ship ascends to the moon. Don't miss one or you'll crash!

36548 16K Extended  
Basic Tape \$19.95



## SPELLING

From B5 Software

Flexible program allows you to input and store words or use graded data tapes. Words flash on screen from .1 to 10 seconds, then player types the word. Complete a lesson, then watch the attractive graphic display of superlative words and sing along!

36605 16K Extended Basic Tape \$16.95

Data Tapes—CANNOT BE USED ALONE \$8.95 EACH

- 35334 Dolch Words
- 29876 Grade 2
- 39260 Grade 3
- 39226 Grade 4
- 37617 Grade 5
- 35356 Grade 6
- 35312 Adult

## TOWER OF FEAR

from Programmer's Guild

Awesome text adventure for novice or experienced. The Wizard's Tower, last of the surviving fortresses, is a catacomb to the omnipresent undead spirit of Blackheart Flamethrower. Enter if you dare, but don't expect to emerge alive!

35031 16K Extended Basic Tape \$19.95

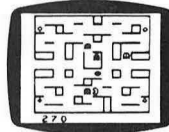


## GHOST GOBLER

from Spectral Associates

In this new and exciting version of the popular arcade game, use your joysticks to move your Ghost Gobler through the maze, eating dots and power pills to score points. 8 bonus shapes, super sound, and 16 skill levels. Extended BASIC required; joysticks.

22611 16K Tape \$21.95



## SCEPTER OF KZIRGLA

from Rainbow Connection Software

Real-time graphics adventure game with arcade sound for the color computer. 13 floors of dungeon with monsters, treasure chests, hidden trap doors... even a flying magic carpet! All in your quest to find the Scepter of Kzirgla. Whatever you do, don't get caught in the poisonous gas cloud! Extended BASIC required.

26514 16K Tape \$19.95

26525 16K Disk \$21.95

Also, Conquest of Kzirgla

27199 16K Tape \$21.95

36537 32K Disk \$26.95



## Programmer's Corner

### COLOR COMPUTER DISASSEMBLER

by Jake Commander from Interpro

Learn machine and assembly language while disassembling any portion of your Color Computer's memory. Features easy-to-read 6809 mnemonics and a BASIC program for you to learn how memory is organized and disassembled.

26390 16K Extended Basic Tape \$19.95

### SUPER "COLOR" DISK-ZAP

by Tim Nelson from Nelson Software

Now, the dream of repair of I/O errors is a reality! Lets you retrieve bashed files including BASIC and Machine Code programs. Special dual cursor screen display shows Hexidecimal and ASC II. Full prompting to help you every step of the way plus manual that teaches disk structure and repair.

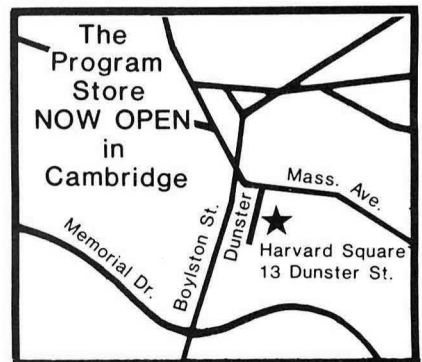
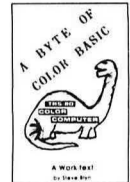
23421 Disk \$69.95

### A BYTE OF BASIC

by Steve Blyn from Computer Island

A work-text that teaches, gives examples and practice exercises about COLOR BASIC. Learn to read, write and understand simple programs, as well as low resolution pictures, songs and music.

41117 Softcover Book \$4.95



Over 2500 Programs for TRS-80,

ATARI 400/800, APPLE, IBM & VIC 20.

For Information Call  
202-363-9797

Visit our other stores:

- 829 Bethel Rd., Columbus, OH
- Seven Corners Center, Fall Church, VA
- W. Bell Plaza, 6600 Security Blvd., Baltimore, MD
- White Flint Mall, Rockville Pike, Rockville, MD
- Harvard Square, 13 Dunster St., Cambridge, MA
- Westmoreland Mall, Rte. 30 East, Greensburg, PA

THE PROGRAM STORE

Franchise Openings  
Available in selected cities.

Coming soon to Philadelphia

To Order Call Toll-Free  
800-424-2738

MAIL ORDERS: Send check or M.O. for total purchase price, plus \$2.00 postage & handling. D.C., MD & VA: add sales tax. Charge cards. Include all embossed information.



© 1983 The Program Store Inc.

THE PROGRAM STORE • Dept. 24-06-3 • Box 9582 • 4200 Wisconsin Avenue, N.W. • Washington, D.C. 20016

| Item #                                                         | Title | Tape/Disk/Rom/Book | Price | Postage \$2.00 | Name           |
|----------------------------------------------------------------|-------|--------------------|-------|----------------|----------------|
|                                                                |       |                    |       |                | Address        |
|                                                                |       |                    |       |                | City State Zip |
|                                                                |       |                    |       |                | Card # Exp.    |
| Computer For TRS-80 Color Computer unless otherwise specified. |       |                    |       |                |                |

along with the computer and imitates just about anything I can think of for speech programs. For Halloween, we had a talking, animated pumpkin. I have experimented with a singing synthesizer (*Son of Cheap Talker?*), but the complications are many due to the relative pitches involved with musical scales. A listing of "Daisy" was generated, but resembled HAL, of 2001, near death! Speech synthesis can be fun and rewarding as well as inexpensive with the Radio Shack Color Computer and *Cheap Talker*.

## BIBLIOGRAPHY

Cater, John P., *Electronically Speaking: Computer Speech Generation*, Howard W. Sams & Co., Inc.

Ciarcia, Steve, "Build the Microvox Text-to-Speech Synthesizer," *BYTE*, Sept. and Oct., 1982.

Clements, Jr., William C., "Add a VIA and Speech Synthesizer to the Color Computer," *MICRO—The 650/6809 Journal*, June 1982.

Grady, Larry, "Microvox," *Color Computer News*, March 1983.

Kelty, John R., "A Cheap Talker for the Color Computer," *Color Computer News*, Nov. 1982.

Reese, Ron and Keller, Scott, "Speech Board Makes Anything Talk!" *Computers and Electronics*, Dec. 1982.

Valdez, Michael E., "Adding Voice to a Computer," *Micro—The 6502/6809 Journal*, Dec., 1982.

Valente, John, "Votrax Interface for SYM," *Micro—The 6502/6809 Journal*, April 1982.

Votrax, "SC-01 Speech Synthesizer Data Sheet," 1980.

## The following are available from:

Kelty Engineering, 1440 N. 61st, Lincoln, NE 68505. 402-467-3298 Cheap Talker, completely assembled and tested speech synthesis system. Includes cartridge with socketed SC-01, program, and manual...\$80 each. Printed circuit board for Cheap Talker...\$15 each. P/H \$2 per order.


The Micromint Inc., 917 Midway, Woodmere, NY 11598. 800-645-3497 Votrax SC-01A voice-synthesis integrated circuit...\$50 each.

The Micro Works, P.O. Box 1110 Del Mar, CA 92014. 619-942-2400 Plastic Rompack type cartridge. 3\*4 size...\$7 each. 4\*4 size...\$6.50 each.

Radio Shack Dual plug-in interface board, Cat. No. 276-163...\$4.95 each.

## ABCs and some words using phonemes:

|             |                        |
|-------------|------------------------|
| A           | AI AY Y                |
| ADD         | AEI EH3 D              |
| B, BE       | B EI Y                 |
| BASIC       | B AI Y S I2 K          |
| C, SEE, SEA | S EI Y                 |
| D           | D EI Y                 |
| DATA        | D A2 Y DT UH1          |
| E           | EI Y                   |
| EIGHT       | A2 AY Y T PAO          |
| ELEVEN      | EI L EH V UH N         |
| END         | EH2 EH3 N D            |
| F           | EH1 EH2 F              |
| FIVE        | F AH1 EI V             |
| FOUR, FOR   | F O R                  |
| G           | D J EI Y               |
| GO          | G O UI                 |
| H           | AI AY Y T CH           |
| HELLO       | A AEI L O2 OI UI       |
| I, EYE      | AH1 EH3 I3 Y           |
| J           | D J EH3 AI AY Y        |
| K           | K EH3 AI AY Y          |
| L           | EH1 EH3 UH3 L          |
| M           | EH1 EH2 M              |
| N           | EH1 EH2 N              |
| NINE        | N AH1 EI N             |
| NO          | N OI O2 UI             |
| O           | O2 OI UI               |
| ONE         | W UH1 N                |
| P           | P EI Y                 |
| Q           | K YI IU UI UI          |
| R, ARE      | AH1 UH2 ER             |
| READY       | R EH1 EH3 D Y          |
| S           | EH1 EH2 S              |
| SEVEN       | S EH V EH1 N           |
| SIX         | S I K S                |
| STOP        | S T AH1 UH3 P PAO      |
| T           | T EI AY Y              |
| TALKER      | T AW K ER              |
| THE         | TH I3 E                |
| TEN         | T EH N                 |
| THREE       | THV R E                |
| TIME        | T AH1 EH3 Y M          |
| TWELVE      | T W EH2 UH3 L V        |
| TWO         | T IU IU U              |
| U, YOU      | YI IU UI UI            |
| V           | V EI AY Y              |
| VOLT        | V O2 O2 L T            |
| W           | D UH1 B UH3 L YI IU UI |
| WRONG       | R AW NG                |
| X           | EH1 EH2 K PAO S        |
| Y           | W AH1 EH3 I3 Y         |
| YES         | YI EH3 EH1 S           |
| Z           | Z EI Y                 |
| ZERO        | Z AY I1 R OI UI        |





### The Micro Catalog

DISCOUNT HARDWARE & SOFTWARE

"TAKE ADVANTAGE OF VOLUME BUYING"

- Some software houses offer up to 50% off for volume buying.
- We are dealers for over one hundred different software houses.
- We market over one thousand different programs.
- CONFIDENTIAL price list.
- NEWSLETTER
- SPECIAL BUYS
- 150 Page CATALOG
- Authors we pay 50%

NEW!

Please send \$9.95 for CATALOG and CONFIDENTIAL PRICE LIST

P. O. Box 3703 Peoria, Il. 61614

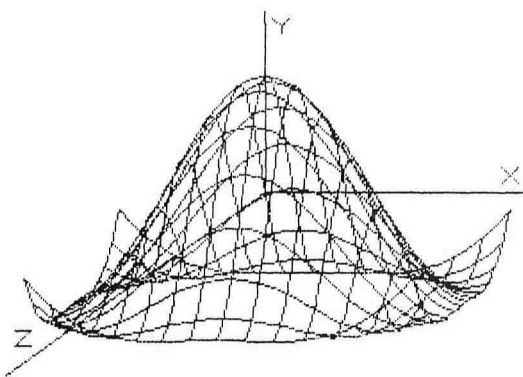


| Phoneme Code | Phoneme Symbol | Duration (ms) | Example Word |
|--------------|----------------|---------------|--------------|
| 00           | EH3            | 59            | jacket       |
| 01           | EH2            | 71            | enlist       |
| 02           | EH1            | 121           | heavy        |
| 03           | PA0            | 47            | no sound     |
| 04           | DT             | 47            | butter       |
| 05           | A2             | 71            | made         |
| 06           | A1             | 103           | made         |
| 07           | ZH             | 90            | azure        |
| 08           | AH2            | 71            | honest       |
| 09           | I3             | 55            | inhibit      |
| 0A           | I2             | 80            | inhibit      |
| 0B           | I1             | 121           | inhibit      |
| 0C           | M              | 103           | mat          |
| 0D           | N              | 80            | sun          |
| 0E           | B              | 71            | bag          |
| 0F           | V              | 71            | van          |
| 10           | CH*            | 71            | chip         |
| 11           | SH             | 121           | shop         |
| 12           | Z              | 71            | zoo          |
| 13           | AW1            | 146           | lawful       |
| 14           | NG             | 121           | thing        |
| 15           | AH1            | 146           | father       |
| 16           | OO1            | 103           | looking      |
| 17           | OO             | 185           | book         |
| 18           | L              | 103           | land         |
| 19           | K              | 80            | trick        |
| 1A           | J*             | 47            | judge        |
| 1B           | H              | 71            | hello        |
| 1C           | G              | 71            | get          |
| 1D           | F              | 103           | fast         |
| 1E           | D              | 55            | paid         |
| 1F           | S              | 90            | pass         |

| Phoneme Code | Phoneme Symbol | Duration (ms) | Example Word |
|--------------|----------------|---------------|--------------|
| 20           | A              | 185           | day          |
| 21           | AY             | 65            | day          |
| 22           | Y1             | 80            | yard         |
| 23           | UH3            | 47            | mission      |
| 24           | AH             | 250           | mop          |
| 25           | P              | 103           | past         |
| 26           | O              | 185           | cold         |
| 27           | I              | 185           | pin          |
| 28           | U              | 185           | move         |
| 29           | Y              | 103           | any          |
| 2A           | T              | 71            | tap          |
| 2B           | R              | 90            | red          |
| 2C           | E              | 185           | meet         |
| 2D           | W              | 80            | win          |
| 2E           | AE             | 185           | dad          |
| 2F           | AE1            | 103           | after        |
| 30           | AW2            | 90            | salty        |
| 31           | UH2            | 71            | about        |
| 32           | UH1            | 103           | uncle        |
| 33           | UH             | 185           | cup          |
| 34           | O2             | 80            | for          |
| 35           | O1             | 121           | aboard       |
| 36           | IU             | 59            | you          |
| 37           | UI             | 90            | you          |
| 38           | THV            | 80            | the          |
| 39           | TH             | 71            | thin         |
| 3A           | ER             | 146           | bird         |
| 3B           | EH             | 185           | get          |
| 3C           | EI             | 121           | be           |
| 3D           | AW             | 250           | call         |
| 3E           | PA1            | 185           | no sound     |
| 3F           | STOP           | 47            | no sound     |

\*T must precede CH to produce J sound.  
D must precede J to produce CH sound.

## YOUR COLOR COMPUTER JUST EARNED A MATH DEGREE!



### MATHMENU

Developed by an engineer, *Mathmenu* is a powerful menu-driven system to turn your Color Computer into an intelligent, flexible tool for mathematics and engineering. *Mathmenu* takes the tedium out of math, leaving your full brain power to attack the "meat" of your problems. By rapidly manipulating matrices and vectors, performing integration and differentiation, solving quadratic equations, plotting user defined functions and much more, *Mathmenu* can help simplify the most complex problems. Whether you are a student or a professional, if you use math, you need *Mathmenu*.

#### FEATURING:

- 3D SURFACE PLOTTING — Plots a user defined equation on an X,Y,Z coordinate system in the High-Res graphics mode. Planes, surfaces of revolution, statistical surfaces, etc. can be easily plotted. Surfaces may be saved to disk or tape. We believe this is the only program of its kind commercially available for the Color Computer.

#### PLUS:


- Complete MATRIX Operations (up to 8 x 8)
- Complete VECTOR Operations
- Numerical Differentiation
- Numerical Integration
- Least Squares Curve Fitting
- Binomial Expansion
- Prime Number Verification
- Main Menu with Single-key Selection and Return (Disk Only)
- 2D Function Plotting
- Rectangular to Polar Conversions
- Base Conversions
- Large Number Addition and Multiplication
- Reverse Polish Logic Calculator with Hexadecimal
- Quadratic Equation Roots

Complete documentation of all functions is included.


For 32K Disk ..... \$49.95  
For 16K Cassette ..... \$44.95  
Documentation only ..... \$5.00 (refundable with purchase)

Or write for free brochure.



Inter  Action

113 Ward Street • Dept. R • New Haven, CT 06519 • (203) 562-5748


 260... 031A  
 500... 0682  
 650... 086E  
 880... 0ABC  
 1320... 0DC1  
 END... 100B

```

10 *****
20 COLOR COMPUTER CHEAP TALKER
30 JOHN R. KELTY
40 1440 N 61ST LINCOLN, NE 68505
50 (402) 467-3298 HOME
60 (402) 472-2793 WORK
70 FEB 23, 1983
80 *****
90
100 DIM Z(200):A=65344:CLS
110 IN=0: INITIAL INFLECTION
120 SET UP 6821 PIA
130 PORT A, PA0-PA5, PHONEME 6-
 BIT CODE TO SYNTHESIZER (OUTPUTS
)
140 PORT A, PA6 AND PA7 ARE INFL
 ECTION BITS
150 I1 AND I2 RESPECTIVELY (OUT
 PUTS)

```

```

160 POKEA+1,0:POKEA,255:POKEA+1,
52
170 THE 6821 CONTROL REGISTER
180 (FOR PORT A) BIT 7 IS SET
190 BY A HIGH TO LOW CA1
200 TRANSITION. THIS GIVES THE
210 PROPER HANDSHAKE LOGIC FOR
220 THE A/R SIGNAL.
230
240 ENABLE CC SOUND MUX INPUT F
 ROM CARTRIDGE
250 POKE65281,180:POKE65283,61:P
 OKE65315,60
260 *****
270 SEND STOP PHONEME
280 P=63:GOSUB600
290 PRINT:PRINT"PHONEME STRING T
 ALKER":PRINT
300 DATA FOR SIGN-ON MESSAGE AN
 D ABC'S.
310 MESSAGE IS "HELLO, I AM THE
 COLOR COMPUTER CHEAP TALKER."
320 DATA 27,47,24,52,53,55,62,62
 ,21,0,9,47,0,12,12,56,60,60
330 DATA 25,25,21,24,58
340 DATA 25,25,50,49,12,37,34,54
 ,55,42,58
350 ABC'S
360 DATA 42,16,60,60,37,3,42,61,
 25,58,62,62,62
370 DATA 6,33,41,14,60,41,31,60,
 41,30,60,41,60,41,2,1,29,30,26,6
 0,41
380 DATA 6,33,41,42,16,21,0,9,41
 ,30,26,0,6,33,41,25,0,6,33,41
390 DATA 2,0,35,24,2,1,12,2,1,13
 ,52,53,55,3
400 DATA 37,60,41,62,25,34,54,55
 ,55,21,49,58,2,1,31,42,60
410 DATA 33,41,34,54,55,55,15,60
 ,33,41,30,50,14,35,24,34
420 DATA 54,54,2,1,25,31,31,45,2
 1,0,9,41,18,60,41
430 DATA 63,63,63,63,63,63,63,63
 ,63,63,63
440 *****
450 USED ONLY FOR SIGNON
460 FOR N=1TO150:READZ(N):NEXTN
470 N=N-1
480 FORI=1TON:P=Z(I):GOSUB600
490 NEXTI
500 *****
510 MAIN LOOP AND ROUTINE
520 SILENCE TALKER,GET NEW OR R
 EPEAT OLD PHONEME STRING,
530 THEN OUTPUT PHONEME CODES T
 O SYNTHESIZER.
540 P=63:GOSUB600
550 GOSUB 660

```

# COLOR COMPUTER WEEKLY

NEW!

**CAN YOU AFFORD \$1 A WEEK?**

The CCW Newsletter will give you this if you can:

- An issue loaded with program listings of all sorts (for just a buck a week—unbelievable)!
- Latest news and information — if it happens on Monday you'll know about it by Friday (for a mere 100 cents a week)!
- Mailed out to you first class every week! (At last a reason to live from week to week)!
- Free software/hardware manufacturer's directory (This alone is worth the price of the subscription, and we even send regular updates to subscribers.)!

All it takes is ten thin dimes a week to bring meaning to your life. Cumulatively we'll take payment in the following ways:

- Charge my Visa or MasterCard at once for the full amount (\$52/year)
- Charge my Visa or MasterCard quarterly at the rate of \$13 every three months
- Here's my check for \$14 for the first quarter, bill me in three months for the next quarter (we have to charge you extra to send out those bills)
- Here's my check for \$52 for the full year hurry and send me my first issue

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Visa  MC Exp. Date \_\_\_\_\_ # \_\_\_\_\_

Tiny Signature \_\_\_\_\_

Send to: CCW • P.O. Box 1355 • Boston, MA 02205



The Color Computer gets serious with

# Computerware® Business Software

## What You Should Know

- It has been in use for over 4 years on many 6809 systems. This means it is well tested.
- Complete manuals accompany the systems.
- User-friendly menus make them easy to use.
- They are not accounting tutorials. They assume you know and use sound accounting principles.

Now Available:

## CHECK LEDGER

**\$195.00**

This is a single entry bookkeeping system which allows the user to define a chart of income and expense accounts. Year-to-date dollar totals are maintained for each account as well as a complete checking account history. By just entering your checking account information, you can have always-current visibility over your income and expense ledgers. Financial statements and taxes are a snap!

## INVENTORY CONTROL

**\$195.00**

This system is designed to help the retailer, distributor, or businessman to keep control of this important factor. It stores your cost and quantity information, updates it immediately, and offers you key management reports with useful summaries at any time. With four costs, four locations, selling history, and vendor information for each item, you will always have the facts!

## PAYROLL

**\$295.00**

This is the most comprehensive payroll you'll find on a microcomputer. Besides collecting key employee information, it allows entry of pay rates for standard hours, overtime, and salary. Hourly, salary, and commissioned employees may be paid weekly, bi-weekly, semi-monthly, and monthly. Two types of special monthly deductions are also accommodated. Year-to-date, quarterly, monthly and current totals are maintained. All federal reporting is done automatically and your state tax computations are also included.

## CORRESPONDENCE SYSTEM

**\$149.00**

We call this the People Manager. It is a very sophisticated people data base system. The system collects name and address information, provides mailing labels or reports of the entire list or any subset upon request. The power of the system lies in the 17 character special code field that is used to identify special characteristics of each person and then can be used to select subgroups for reports and labels used in special marketing or contacts. Tested with data bases of 15 to 7,000 entries this system has been in use with retailers, clubs, churches and professionals for years.

## ACCOUNTS PAYABLE

**\$195.00**

This system can give you the tools to plan your business' growth by controlling expenditures and forecasting cash requirements. It helps a small business manage and track its cash liabilities by collecting vendor invoice information and reporting the business' cash commitments and payment history.

## ACCOUNT RECEIVABLE

**\$149.00**

All businesses need to know who owes them money! This system provides reliable and timely information regarding the status of all customer accounts. You can know instantly which accounts are past due, forecast how much money to expect to receive for cash flow planning, and keep on top of your customers' credit positions. Customer name, address, credit limit, invoice, and payment information is recorded and reports of all information are available upon your request.

System Requirement:

- Flex Operating System
- 64K Memory
- Computerware® Random BASIC
- Dual Disk Drives (Payroll Requires double-sided drives)



Computerware is a trademark of Computerware

Box 668  
Encinitas, Ca. 92024  
(619) 436-3512

```

560 FORI=1TON:P=Z(I):GOSUB600
570 NEXTI:GOTO540
580 '*****
590 'TALK OUTPUT ROUTINE
600 POKEA,P:'PLACE 6-BIT PHONEME
CODE AND INFLECTION ON PORT A
610 POKEA+1,52:'STB HIGH
620 POKEA+1,60:'STB LOW
630 V=PEEK(A):'DUMMY READ TO RES
ET CA1
640 IF (PEEK(A+1)AND128)THENRETU
RNELSE640'RETURN WHEN A/R GOES H
IGH
650 '*****
660 'LOAD PHONEME STRING
670 PRINT:PRINT"PRESS @ KEY TO P
LAY OLD STRING"
680 PRINT"OR INPUT NEW STRING XX
,XX, ETC."
690 AN$=""
700 A$=INKEY$:IFA$=""THEN700
710 PRINTA$;
720 AN$=AN$+A$
730 IFA$="@ "THENRETURN
740 IFA$=CHR$(13)THEN750ELSE700
750 'DECODE STRING
760 ST=1:I=1:P$="":A$=""
770 'P$=NEXT PHONEME WHEN DONE A
ND IS MADE UP USING A$
780 'AN$=ENTIRE STATEMENT INCLUD
ING DELIMITERS (SPACE OR COMMAS)
790 P$=P$+A$
800 A$=MID$(AN$,ST,1)
810 'ST IS COUNTER USED TO STEP
THROUGH AN$
820 ST=ST+1
830 IF A$=CHR$(44)ORA$=CHR$(32)O
RA$=CHR$(13)THENGOSUB890ELSE790
840 IF A$=CHR$(13)THEN870
850 A$=""
860 GOTO 790
870 N=I-1:RETURN
880 '*****
890 'PHONEME CODES
900 IFP$="EH3"THENP=0
910 IFP$="EH2"THENP=1
920 IFP$="EH1"THENP=2
930 IFP$="PA0"THENP=3
940 IFP$="DT"THENP=4
950 IFP$="A2"THENP=5
960 IFP$="A1"THENP=6
970 IFP$="ZH"THENP=7
980 IFP$="AH2"THENP=8
990 IFP$="I3"THENP=9
1000 IFP$="I2"THENP=10
1010 IFP$="I1"THENP=11
1020 IFP$="M"THENP=12
1030 IFP$="N"THENP=13
1040 IFP$="B"THENP=14
1050 IFP$="V"THENP=15

```

```

1060 IFP$="CH"THENP=16
1070 IFP$="SH"THENP=17
1080 IFP$="Z"THENP=18
1090 IFP$="AW1"THENP=19
1100 IFP$="NG"THENP=20
1110 IFP$="AH1"THENP=21
1120 IFP$="OO1"THENP=22
1130 IFP$="OO"THENP=23
1140 IFP$="L"THENP=24
1150 IFP$="K"THENP=25
1160 IFP$="J"THENP=26
1170 IFP$="H"THENP=27
1180 IFP$="G"THENP=28
1190 IFP$="F"THENP=29
1200 IFP$="D"THENP=30
1210 IFP$="S"THENP=31
1220 IFP$="A"THENP=32
1230 IFP$="AY"THENP=33
1240 IFP$="Y1"THENP=34
1250 IFP$="UH3"THENP=35
1260 IFP$="AH"THENP=36
1270 IFP$="P"THENP=37
1280 IFP$="O"THENP=38
1290 IFP$="I"THENP=39
1300 IFP$="U"THENP=40
1310 IFP$="Y"THENP=41
1320 IFP$="T"THENP=42
1330 IFP$="R"THENP=43
1340 IFP$="E"THENP=44
1350 IFP$="W"THENP=45
1360 IFP$="AE"THENP=46
1370 IFP$="AE1"THENP=47
1380 IFP$="AW2"THENP=48
1390 IFP$="UH2"THENP=49
1400 IFP$="UH1"THENP=50
1410 IFP$="UH"THENP=51
1420 IFP$="O2"THENP=52
1430 IFP$="O1"THENP=53
1440 IFP$="IU"THENP=54
1450 IFP$="U1"THENP=55
1460 IFP$="THV"THENP=56
1470 IFP$="TH"THENP=57
1480 IFP$="ER"THENP=58
1490 IFP$="EH"THENP=59
1500 IFP$="E1"THENP=60
1510 IFP$="AW"THENP=61
1520 IFP$="PA1"THENP=62
1530 IFP$="STOP"THENP=63
1540 Z(I)=P+IN
1550 '*****
1560 'INFLECTION BITS ARE ADDED
TO PHONEME CODES
1570 IFP$="IN0"THENIN=0
1580 IFP$="IN1"THENIN=64
1590 IFP$="IN2"THENIN=128
1600 IFP$="IN3"THENIN=192
1610 I=I+1
1620 P$=""
1630 RETURN

```



RAINBOW CONNECTION SOFTWARE presents . . .



# Rainbow -Writer SCREEN FORMATTER



The ultimate in hi-res graphics text display. Allows your Color Computer to *write* text on any graphics screen in *Rainbow* colors.



## CHECK THESE IMPORTANT FEATURES:

- **User definable 224 character set** featuring true lowercase with descenders, improved cursor, slashed zero, Greek math symbols, lunar landers, stick figures, tanks, cars, planes, card suits, etc.
- **Supplied character generator program** allows easy creation of colored, animated figures to save and use in your own character-graphics programs.
- **Works in all PMODES.** Four-color artifacted characters in PMODE 4 (highest resolution)!
- **Two character sets for maximum clarity** produce four character densities: 32 x 16, 42 x 24, 50 x 24, 64 x 24, plus double widths in PMODE 4.
- **Pre-loader allows optimum loading** in 16K, 32K or 64K machines. The 64K selection automatically transfers all ROM (including cartridge) to RAM.
- **ML extension of BASIC** completely interfaced and transparent incorporating direct conversion of **all keys and commands** including PRINT @.
- **Automatic underline, superscript, subscript, reverse video, top and bottom definable scroll protect options.**
- **User friendly** — easy operation via Status/Help screen, simple commands, no messy peeks and pokes.
- **Use all day** for hi-density screen displays, graph labels and listings, or **incorporate into your own BASIC or ML** games, word processors, etc.
- **Special EDTASM+ command** allows instant compatibility with R.S. editor-assembler cartridge.
- **Built in syntax error detection** and messages.
- **Includes** demo program, tape/disk conversion instructions, character generator program, and operators manual.

16K Extended Basic Required  
\$29.95 Cass — \$32.95 Disk

Yes, I want to easily create dazzling displays with the best **SCREEN** formatter for my Color Computer. Please RUSH me the incredible **RAINBOW-WRITER** (16K Extended Basic Required) at the affordable price of \$29.95 tape - \$32.95 disk \$\_\_\_\_\_

Name (print) \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Great **Graphic Adventures** from RCS

**SCEPTER of KZIRGLA** \$16.95 tape - \$19.95 disk \$\_\_\_\_\_

**CONQUEST of KZIRGLA** \$21.95 tape - \$24.95 disk \$\_\_\_\_\_

Send SASE for catalog. Shipping & handling \$ 2.00

Personal checks welcome! Minn res add 6% tax \$\_\_\_\_\_

\$\_\_\_\_\_ Exp \_\_\_\_\_ Visa & MC add 3% \$\_\_\_\_\_

TOTAL enclosed \$\_\_\_\_\_

RAINBOW CONNECTION SOFTWARE

3514 6th Place NW  
Rochester, MN 55901

Not Affiliated With  
The RAINBOW



## Three Handy Utilities For 64K Disk Systems

A close inspection of the Spectrum Projects ad in last month's issue will reveal an offering called *64K Disk Utility Package* by Larry Banks Software. This package actually consists of three separate utility programs for a 64K Disk based CoCo. With the price of 64K chips going down to less than \$50 a set, why not jump on the bandwagon? This utility package will give you an idea of the capabilities of a 64K machine. The three programs are named *40K*, *Software Print Spooler*, and *ROMcrack*.

The first program of the set is *40K*, a utility that moves the Extended BASIC ROM from \$8000 to \$D800. After a *LOADM"40K":EXEC*, a *PRINT MEM* statement will display 31015, an extra 8K of memory for your use. The manual states that \$0000 to \$9FFF is available for programs but this is not exactly true as certain low memory still contains that necessary stuff such as the screen display, buffers, etc. One interesting point noted is that after a *PCLEAR* statement you get a minus amount of available RAM. Numbers above 32767 are treated as negative by this command. I guess no one thought there would be more than 32K available in a CoCo. This particular program does not require a disk and, in fact, is available on cassette tape. The program performs as advertised and was tested with several of the longest programs I could find. None came close to invoking the dreaded OM error message. Caution is given regarding the use of the RESET button as this will wipe out any program currently in memory.

*Software Print Spooler* is loaded from disk by a *RUN*

"*SPOOL64*" command and automatically executes and returns to BASIC. I was impressed. One of the programs I frequently use to answer the question of "What can this thing do?" is a biorhythm plotter. It is a unique program in that it calculates the values of screen output and formats a *PRINT* statement before each line is output to the printer. Due to the calculations required, a small wait is expected between lines as they print. After running this program with *SPOOL64* you can appreciate the value of a "spooler." After answering all of the required information the program requires to execute, an OK prompt is on your screen while the printer is still working on the chart. Other calculations can be initiated and sent to the printer. This is only one example of the value of a buffered printer but I will leave it to you to determine the need. It sure is nice to put the extra memory gained in a 64K system to a useful purpose. One drawback of this program was the inability to function with a non-standard printer. Printer driver routines are no longer effective. Also, the printer must be operated at a baud rate of 1200 or higher.

The last program of the group will probably have the broadest appeal. *ROMcrack* is a utility allowing you to put ROMPack cartridges on disk for instant access. The procedure is not very complicated. First, the ROMPack is saved to tape by placing a piece of tape on Pin 7 and performing a *CSAVE"ROM",&HC000,&HE000,&H000*. Rewind the cassette, *LOAD"ROMCRACK",RUN* and magically your favorite game, etc, is on disk. You can now run your favorite games from disk by a *LOADM"filename":EXEC* command. Constant unplugging of the disk controller is avoided. I am not going to give away the secret of how this is accomplished, but I will guarantee that it works and once you see the program listing you will probably say "Why didn't I think of that!" The program was tested with no fewer than six ROMPacks and performed flawlessly.

I would recommend the 64K Disk Utility Package as an excellent addition to your software library. The documentation is average, but enough information is given to explain the program operation. Even though it is not part of this review I don't think you can beat the price of \$49.95 for a set of 64K RAM chips from Spectrum Projects. I hope you can see some of the advantages of a 64K system.

(Spectrum Projects, 93-15 86th Drive, Woodhaven, NY 11421, disk, \$21.95)

—Dan Downard

### ("I CAN TALK!") TALK PROCESSOR

Quick and easy to use. No programming required. Has 26 common words. Just type in 2-letter codes and make hundreds of statements in 3 voices. Uses digitally recorded human speech. "Extremely clear". Rated good - *Rainbow Nov. 82* 16K Ext. Basic \$14.95

#### "ADD-A-VOICE" - to your own Basic programs.

A machine language utility (uses 4K). Generate digitized human speech with just a few simple Basic commands. GAME SET (I, WIN, GOT, YOU, etc.) and QUIZ SET (YES, NO, RIGHT, GOOD, etc.). You get both sets - 25 words total. Specify 16K or 32K. Needs no Ext. Basic. \$14.95

#### SUB-MISSION - HI-RES COLOR ACTION GAME

for 16K Ext. Basic. *BONUS*: Order Sub-Mission and get "Missile Attack Underground" game FREE.

JOYSTICK REQUIRED \$12.95

For immediate shipment send certified check or money order. Personal check orders shipped in 2 weeks. Send to H.I.B., 3505 Hutch Place, Chevy Chase, MD 20815. Phone 301 656-1825 after 6 p.m. Add \$1.00 for shipping.



**H.I.B. SOFTWARE**  
FOR THE TRS 80 COLOR COMPUTER

## Back Issue Availability

Back copies of many issues of the *RAINBOW* are still available.

All back issues sell for the single issue cover price—which is \$2 for copies of Volume 1, Numbers 1-8 (through February, 1982), \$2.50 for Volume 1, Numbers 9, 10 and 12 (through June except May, 1982) and \$2.95 for those issues thereafter. In addition, there is a \$3.50 charge *per order* for postage and handling if sent by United Parcel Service and \$6 for orders sent U.S. Mail. UPS *will not* deliver to a post office box or to another country. This charge applies whether you want one back issue or all of them.

Most back issues are available on white paper in a reprint form. Issues out of print include May, July, August, September, October, November, and December, 1982 and January, February, 1983. VISA, MasterCard and American Express accepted. Kentucky residents please add 5 percent state sales tax.

Due to heavy demand, we suggest you order back issues you want now while supplies last.

In addition, copies of the cover *only* of the July, 1982, Anniversary Issue are available separately for \$1 each, plus 50 cents shipping and handling. These are suitable for framing.





Dear Kids,

Well, I have my Color Computer fixed up in my den, right beneath the deer's foot hatrack, and right beside the old couch. I shouldn't be telling you this but that couch right now serves as a bed for me, because Aunt Bertha is still a little touchy about the pig incident which I'm sure I told you about, but in case I didn't, I promise I will, real soon.

In the meantime, though, I want to tell you about this new Color LOGO for the Color Computer. Color LOGO comes both in a cartridge form for a 16K machine, and disk form for the 32K machine. If you want to save any of your work, you'll need a cassette recorder for the cartridge system; but with the disk system, you can save everything right on the disk. I happen to have the cartridge form, but everybody

tells me that the disk form works very much the same.

Now I guess everybody has heard about this programming language called LOGO, that was created at an eastern college by Seymour Papert and others (including Wallace Feurzeig, Harold Abelson, and Andrea DiSessa).

There are all kinds of things that people say about LOGO. They say that Mr. Papert and his friends designed LOGO, for instance, so that young children could learn how to program a computer without having to *study* at it. What I mean is that the LOGO language is supposed to be the kind of thing where you just play around with it, maybe work a little, and gradually you begin to discover things about how it works. They say it's a learners' language, or should I say—how is it put?—a “child-oriented, discovery-oriented” programming language. In his book, *Mindstorms*, Seymour Papert talks a lot about LOGO and about other things, and I guess one of his ideas is that LOGO can take very high mathematical ideas and concepts, and bring them down to earth—make them “concrete” is the word he uses. I don't know about concrete, but we shall see about that, because I'm going to be your living guinea pig for the next several months. It's a good thing that LOGO is a learners' language, because I am really a learner and I'm just beginning. So all of you who want to learn right along with me can continue reading, but all of you who already know something about Color LOGO should stop reading right now and come back in three months. Including me.

But first, let me say another thing. The original LOGO was developed starting about 1968 on a big computer system. As I just mentioned, Mr. Papert and others are trying to develop a computer system that would make mathematical ideas “concrete” (ferroconcrete would be longer lasting).

## EDUCATIONAL PROGRAMS

### DON'T HAVE TO BE BORING!

AND HERE ARE TWO NEW ONES FROM CREATIVE TECHNICAL CONSULTANTS TO PROVE IT

#### ALPHABET SOUP

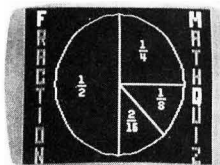


All the challenge and excitement of an arcade game plus the fun and competition of a board game. It's a word recognition and spelling game with one to five players competing against each other and the clock. Since each player can have a different skill level, the whole family can compete and enjoy.

*“EDUCATIONALLY NUTRITIOUS . . . . . A REAL DELIGHT”*  
the RAINBOW - February, 1983 . . . . . \$ 14.95



#### FRACTION MATH QUIZ



An entertaining fraction drill program for a single player. Choose from a menu of seven fraction operations - reducing, adding, subtracting, multiplying, dividing, converting mixed numbers to fractions, and converting fractions to decimals. Multiple choice answer formats, five skill levels, and personalized screen messages make this program fun for students of all ages . . . . . \$ 14.95

- Both programs for the 16K Color Computer with Extended BASIC.
- Versions also available for 16K Color Computers without Extended BASIC.
- Quantity discounts available to schools.
- Prices include postage and handling. Send check or money order to:

**Creative  
Technical  
Consultants**

P.O. Box 652, Cedar Crest, NM 87008

One thing they did was hook up a computer to a little robot that looked and moved kind of like a turtle—they called the robot a “turtle.” Now, the point is that LOGO can be used to draw pictures with a turtle, but it also is meant to do a lot more.

According to David Thornburg (in the March, 1983 issue of *Compute*), a lot of people think that LOGO is nothing but turtle drawings (graphics), and that turtle drawing is LOGO. But they're wrong. LOGO is more than turtle graphics. Thornburg says: “Atari PILOT has turtle graphics, but it's not LOGO.” He also says that Color LOGO, although it has “superb turtle graphics” is also not really LOGO. He goes on to say that the “Radio Shack Color Computer supports much of what we expect from LOGO—extensibility, local variables, recursion, and turtle graphics. However, the only variables that can be used with this language are numbers. There is none of the list processing capability that gives LOGO its tremendous power as a symbol manipulation language.”

Well, I don't know about all this, and I wonder if anyone out there has any good opinions. As I understand it, Color LOGO doesn't have something called “list processing,” which is supposed to be a very important part of “the real LOGO.” People such as David Thornburg and others would like to call this new product “turtle graphics.” Whatever the case, Color LOGO works on an inexpensive machine, and the disk itself is not very expensive (the cartridge is even less expensive). The turtle graphics it creates are supposed to be good. Thus, at the very least it's a good way to get started with turtle graphics.

## Aurora Software

49 BROOKLAND AVE.  
AURORA, ONTARIO  
CANADA L4G 2H6

### FAMILY GAMES

FOR 16K AND 32K COLOR COMPUTER

**STOCKBROKER** — Up to 6 players can play the stock market. For 16K or 32K ECB. The 32K is in High-Res Graphics.

**CRIBBAGE** — For 2 or 4 players. In High-Res Graphics! (for 32K).

**BATTLE** — Will you get bombed before you can find all the ships? An extremely entertaining game for the family.

**COLORMIND** — Up to 4 players challenge for hidden-colors.

**REMREM** — Challenge your friends. Who can remember the longest color sequence?

**CONCEN** — Challenge the computer or a friend to a good ol' game of concentration.

ALL GAMES only \$20.00 or ANY TWO for \$35.00

ALSO FROM *Aurora Software*:

**MR. COPY** — A quality copier written in M.L. that will make backup tape copies. MR. COPY is capable of making up to 99 copies in one loading! \$25.00

**ROMDISK** — If you have a modified 32K C.C. machine ROMDISK will allow you to load your R.S. Rom Packs from a disk! \$20.00

Controversy! I'm not an expert, so I can't really say much more, but I know there are experts out there who might be willing to explain all this in greater detail in a letter. So send me a letter, you experts, and I'll see that your expertise gets in print.

Well, I have my Color Computer here. It's turned on, and I'm in the *BREAK* corridor. Let's just try out a little turtle graphics, and see what happens. So, press R and enter the *RUN* room.

Now, that tiny outhouse-shaped object in the center of the screen is really a turtle that can draw. Type in *FORWARD* 10, for instance, press *ENTER*, and the turtle will move straight up and deposit a short line where it's moved. Actually, you can shorten that command to *FD* 10.

Try other numbers after *FD*. Now try to move the turtle right back to where it started: type in *BACK* 10, followed by an *ENTER*. Then type in *BACK* with whatever other numbers are necessary to get the turtle right back to where it started. (You can shorten *BACK* to *BK*.)

Is the turtle back in the center of the screen? Good. Now, type in *RIGHT* 45, and press *ENTER*. What happens? Now type in *RIGHT* 45, and *ENTER*.

Now type in *LEFT* 90, and *ENTER*. You should be back to the original position. (You can shorten *RIGHT* to *RT*, and *LEFT* to *LT*.)

Now enter the following sequence:

LT 90

LT 90

LT 90

LT 90

Now enter this:

FD 30

RT 90

FD 30

RT 90

FD 30

FT 90

FD 30

Well, that's semi-interesting. You should have a square on your screen. Now, how about trying to draw a pentagon, a hexagon, an octagon, a decagon (ten-agon)? Try to draw a circle. Try a triangle. All of these shapes and figures will be useful later on. Send me a letter: let me know how you did it. Is there more than one way to do any of these? How can I think about drawing these shapes? How did you figure them out?

I see I'm running out of space, so we'll have to continue next month. I'll try my darndest then to fill you in on the pig incident and other important things. Be good, kids and tell your dad to get a LOGO cartridge for your Color Computer. Greetings to all. I remain,

Uncle Bert

P.S. You can send your cards and letters to me in care of my good friend Dale Peterson. Just address them like this:

Uncle Bert Woofensburger

c/o Dale Peterson

*the Rainbow*

9529 U.S. Highway 42

P.O. Box 209

Prospect, KY 40059





# COLORSPEAK™

COLOR COMPUTER VOICE SYNTHESIZER

**NEW!**

## HARDWARE FEATURES

- A COMPLETE PHONEME BASED VOICE SYNTHESIZER IN A CARTRIDGE STYLE PAK
- COLORSPEAK HAS ITS PROGRAM IN ROM, SO ITS INSTANTLY THERE ON TURN ON!
- COLORSPEAK HAS ITS OWN 2K RAM. IT REQUIRES NO MEMORY!
- USES THE VOTRAX™ SC01 PHONEME SYNTHESIZER CHIP
- WORKS IN ALL COLOR COMPUTERS. ANY MEMORY SIZE, EITHER BASIC!

## SOFTWARE FEATURES

- TEXT TO SPEECH MODE: CONVERTS PLAIN ENGLISH TEXT TO SPEECH!
- INFLECTION MODE: ADDS VOICE INFLECTION TO TEXT TO SPEECH MODE
- PHONEME MODE: ALLOWS PROGRAMMING THE SC01 DIRECTLY IN PHONEMES
- SPELLING MODE: SPELLS TEXT AND PRONOUNCES MOST PUNCTUATION

USER FRIENDLY! COLORSPEAK IS THE EASY TO USE VOICE SYNTHESIZER WITH ALL FEATURES EASILY ACCESSIBLE FROM BASIC. SIMPLY PUT THE WORD OR PHRASE TO SPEAK IN A STRING NAMED TALK\$. THEN CALL THE USR ROUTINE TO SPEAK THE TEXT! ALL OF BASIC'S STRING MANIPULATIONS ARE APPLICABLE. COLORSPEAK COMES WITH A DETAILED USER MANUAL AND PHONEME DICTIONARY.

PRICE \$169

**BUMBLEBEE SOFTWARE**

PO BOX 25427 CHICAGO IL 60625

USER MANUAL \$4

## ARCADE ACTION

### NOVA-PINBALL

AN EXCITING NEW PINBALL SIMULATION FOR THE COLOR COMPUTER! WITH ALL THE ACTION THAT'S MADE IT AN ALL TIME FAVORITE!

\$20

# NOVA

### CYBORG WARS

Your mission is to destroy all robots and save the surviving humans. Watch for the missile firing BRAINS and the fatal touch of the HULKS!

\$18



### PAC-MAC

Great PAC-MAN action!

\$15



# HIRES COLOR

### DERBY

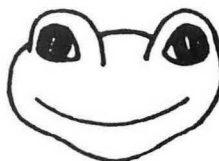
Race around the track with a computer controlled car in pursuit. Like the arcade, DODGE-EM!

\$14

### HOPPY

GUIDE HOPPY SAFELY HOME TO HIS DOCK. TRAVEL ACROSS A HIGHWAY AND HOP ON LOGS & TURTLES TO GET THERE! LIKE THE ARCADE!

\$18



ALL PROGRAMS  
MACHINE  
LANGUAGE  
■  
REQUIRE  
16k

DEALER, AUTHOR INQUIRIES INVITED

## CORRECTIONS

All of *the Rainbow's* program listings are printed on an Epson MX-80F/T dot matrix printer formatted for 32 character line width, double-strike and emphasis. We consider it a dependable, workhorse of a machine and have encountered only one occasional problem—about once a month it seems to miss a carriage return (or *ENTER*) command when *LLISTing* a program. Such is the case on page 40 of the June 1983 *Rainbow*. Lines 28 and 29 of *Rainbow Roach* are tacked on the end of line 27 rather than printed out as separate lines even though the original program and *Rainbow on Tape* both list 28 and 29 as separate lines. We regret any inconvenience this may have caused.

An error in the P 'n' P Real Time Clock program as published in the April issue of *Rainbow* causes the day of the week to be displayed incorrectly at times. The correction is:

1. In line 210 change the + to —. The line now reads:  
210 DAY=(INSTR(1,"SUMOTUWETHFRSA",LEFT\$(A\$,2))-1)/2
2. In line 340 change 39 to 43. The line now reads:  
340 DATA 230,88,88,48,141,0,43,58,198,4

In "PATCHing The Patch: *EDTASM+* To Disk Revisited" (April 1983), Roger Schrag's street number was listed incorrectly. His correct address is: 2054 Manning Avenue, Los Angeles, Cal., 90025.

In Bob Rosen's short article, "This Will Program Your Keys On *Professional Keyboard*" (June 1983), data items are incomplete in lines 2 and 10. Correctly, these lines should read:

```
2 CLEAR200,A—226:A=PEEK(116)*256+PEEK(117):
FOR X=A—226 TO A: READ A$: POKE X, VAL
("&H"+A$):NEXT:EXEC A—226:NEW
10 DATA BE,01,6B,0F,FD,9F,F8,BE,01,68,BF,7C,
E1,31,8D,00,15,10,BF,01,6B,86,7E,B7,01,6A,B7,01,
67,31,8D,00,B1,10,BF,01,68,39,32,62,AD,9F,00,F8,
0F,70,0D,6F,27,03,7E,A1,7F,BD,A1,B1,81,BD,27,
F9,81,04,27,F5,81,67,27,45,81,13,10,27,00,4E,34,02,
B6,01,56,85
```

Also, while the program, as written, works with disk, cassette users will want to change line 30 to read:

```
30 DATA 2F,8E,04,00,C6,20,A6,80,81,60,26,04,86,
20,20,0E,81,20,24,04,8B,60,20,06,81,60,25,02,88,40,
84,7F,BD,A2,BF,5A,26,E0,86,0D,BD,A2,BF,8C,06,
00,26,D4,35,B6,0D,6F,26,0A,0D,FD,27,06,81,41,25,
02,88,20,7E,82,73
```

# TALK IS CHEAP.



You want your color computer to talk, but how much will it cost?

\$50? \$100? \$200? No.

## \$29<sup>95</sup>?

Yes! **SPEAK UP!**<sup>™</sup> from *Classical Computing, Inc.* is a machine language

800—334-0854 Ext. 890



Voice Synthesizer program for your TRS-80 Color Computer.\* It is 100% software. Nothing else to buy. Best of all, YOU CAN MAKE BASIC PROGRAMS TALK! It's easy to use, and will say virtually anything.

**SPEAK UP! For \$29.95.**

**Talk really is cheap!**

*Classical Computing, Inc.*

P.O. Box 3318,  
Chapel Hill, NC 27515



\*T.M. Tandy Corp.

16k minimum



THE ONE  
AND ONLY!

HANDY!

UNIQUE!

USEFUL  
AND FUN!

GREAT!

BEST!

SAVE!

FOR  
HOBBYISTS!

● **ROML — ROM PAK Loader**

- Save your ROM PAKs (or ANY machine language program) on disk then load and execute with ROML.
- You no longer need to remove your disk controller to execute your ROM PAK software!
- Also allows you to load from disk or tape and execute all machine language programs which are incompatible with the disk system!
- Includes a utility to copy non-protected tapes to disk.
- Note—ROM PAK execution requires good 64K RAM system.
- Copy of article included describing how to access 64K RAM.

Tape: \$25.00      Disk: \$29.00

● **PLUS32— 64K RAM Enabler**

- Puts your system into the 64k RAM mode. Makes RAM above BASIC available for machine language programs.
- Runs ROM BASIC from RAM where you can modify it!
- Will not crash system if upper 32K is defective or not available.
- Note—Requires good 64K RAM system.

Tape: \$15.00      Disk: \$19.00

● **ROMKIL — BASIC ROM disable routine**

- Frees up extra RAM by:
  - Disabling DISK BASIC ROM—returning your system to EXTENDED BASIC, or
  - Disabling EXTENDED BASIC ROM—returning your system to COLOR BASIC.
- Allows disk-incompatible machine language programs to be loaded and executed from tape without removing the disk controller.

Tape: \$15.00      Disk: \$19.00

● **BANNER — Creates GIANT Moving Messages**

- Make your TV a moving Marquee with Color BANNER!
- Enter any message and have it move across the screen in GIANT letters in the colors of your choice.
- Control speed, delay and pause from within your message!
- Great for parties and exhibitions!

Tape: \$19.00      Disk: \$23.00

● **Nelson's SUPER "COLOR" LIBRARY**

- **Super "Color" Writer II\***      ROM PAK: \$89.95      Disk: \$99.95  
- By far the BEST word processor available for the Color Computer.
- **Super "Color" Mailer**      Tape: \$39.95      Disk: \$59.95  
- Powerful multi-purpose mailing list merging & sorting program. Uses SCWII files.
- **Super "Color" Speller**      Disk Only: \$69.95  
- Fast, proofreading program. Proofs against a stock dictionary, plus one you design.
- **Super "Color" Calc\***      ROM PAK: \$89.95      Disk: \$99.95  
- The finest electronic worksheet you can find for the Color Computer. Rivals VisiCalc.
- **Super "Color" Terminal\***      Tape: \$49.95      ROM PAK: \$59.95      Disk: \$69.95  
- Makes communicating with ANY computer a breeze.
- **Super "Color" Disk-ZAP**      Disk Only: \$49.95  
- The ultimate repair utility for simple and quick repair of all repairable disk errors.
- **Super "Color" Database**      Disk Only: \$79.95  
- Data sorted in records you design. Can be used to: sort, do math, create reports, and much more.

\*Supports four different screen sizes: 32X16 and 51-64-85X21, with lowercase!

● **LCA-47 — Lower Case Adapter**

- Provides real lowercase letters with true descenders!
- Compatible with ALL Color Computer Software!
- Provides bright characters on a dark background!
- Superb User's Manual included.
- Easy 5 minute installation!
- Uses NO system memory!
- 1 year warranty.
- Hundreds of owners, all happy!

Assembled and Tested: \$75.00

● **SPECIAL — Save \$25.00 when you purchase Super "Color" Writer II and an LCA-47 at the same time! Order NOW!**

● **PP-16 — EPROM Programmer**

- Programs single supply 2516, 2716, and 2758 EPROMs.
- Program—entire or partial. Auto verify after programming.
- Transfer contents to RAM for modifying or duplicating.

- Select Documentation for:      Interface to:  
6502      6820 PIA or 6522 VIA  
6800      6820 PIA  
6809      6820 PIA  
8080/8085/Z80      8255 PPI

- Comprehensive documentation booklet contains schematic, instructions for construction, check-out and use, and a well commented assembly listing for the specified MPU.
- Note—User must supply the specified parallel interface.
- Specify MPU and computer system when ordering.

Complete Kit (includes ZIF socket): \$45.00

PC board only (with documentation): \$25.00



**Micro Technical Products, Inc.**

123 N. Serrine, Suite 106-A  
Mesa, Arizona 85201  
Phone: 602-834-0283



Add 5% for shipping, minimum \$2.00. Overseas 10%,  
minimum \$4.00. Arizona, add 5% tax.



# TWO YEARS OF RAINBOW

*An Index to the Articles, Reviews and Authors  
Appearing in the Rainbow From July 1981 Through  
June 1983*

Compiled and Edited

by  
Leslie A. Foster

©1983 Falsoft, Inc.

**ASSEMBLY LANGUAGE**

- Lewandowski, Dennis S. "Assembly corner: A look at editor/assemblers." (1983, February) 194
- Lewandowski, Dennis S. "Assembly corner: Assembly language makes good graphics easy." (1982, October) 92
- Lewandowski, Dennis S. "Assembly corner: Beyond the Vaders." (1983, March) 218
- Lewandowski, Dennis S. "Assembly corner: Down to business with this ML graphics game." (1982, November) 90
- Lewandowski, Dennis S. "Assembly corner: Let's blast those vaders." (1982, December) 106
- Lewandowski, Dennis S. "Assembly corner: Let's soak up some assembly." (1982, July) 38
- Lewandowski, Dennis S. "Assembly corner: Questions Questions and some answers for everyone." (1982, September) 73
- Lewandowski, Dennis S. "Assembly corner: Write an ML program to handle BASIC chores." (1983, April) 98
- Lewandowski, Dennis S. "Assembly corner." (1982, April) 4
- Lewandowski, Dennis S. "Assembly corner." (1982, May) 47
- Lewandowski, Dennis S. "Assembly corner." (1982, June) 6
- Lewandowski, Dennis S. "Assembly corner." (1982, August) 22
- Roslund, Charles J. "A mini-monitor for machine language use." (1982, October) 38
- Schrag, Roger. "Patching EDTASM to run on Disk." (1982, December) 29
- Schrag, Roger. "Patching the patch: EDTASM to disk revealed." (1983, April) 194

**BUSINESS**

- Ericson, Robert W. "Building Spectaculator shells." (1983, April) 74
- Garrett, Ron. "Set up for accounts receivable." (1982, October) 118
- Garrett, Ron. "Want some money? Send out a statement." (1982, November) 98
- Knight, Glenn B. "Power of attorney." (1983, March) 56
- Peppenhurst, Stan. "Make authoritative decisions with this situational model." (1983, February) 132
- Posner, Judd. "A small business accounting system." (1982, November) 108

**COMMUNICATIONS**

- Downard, Dan. "Smarts for a dumb terminal." (1983, March) 160
- Dudgeon, Jim ; and Dudgeon, Michael. "Videotex to disk." (1982, February) 11
- Hardy, Harry. "Data communications and your Color Computer." (1983, April) 78
- Hardy, Harry. "Data communications and your Color Computer." (1983, June) 240

- Mir, Jorge. "Downloading from Videotex." (1981, November) 9

**DISK**

- "Disc savem." (1981, December) 1
- "Disk file conversions." (1982, January) 8
- Falk, Lawrence C. "A tale of two discs." (1981, December) 3
- Heffer, Martin. "Living with one disk." (1983, April) 174
- "Machine language and your disk drive." (1982, January) 16
- Mir, Jorge. "Make an index for your disc." (1982, February) 23
- Mir, Jorge. "Poking memory with a disc." (1982, March) 29
- Plog, Michael. "Hard copy your diskette listings with style." (1983, March) 126
- Roslund, Charles J. "Disk directory printout." (1982, March) 31
- Rutledge, E. P. "Disk file helps you keep track of everything." (1982, July) 30
- Selig, Paul. "Three disk utilities give you filing help." (1982, December) 110
- "Speed up your disk." (1982, June) 66
- Szlucha, Thomas F. "How to 'zunk proof' your disk directories." (1983, June) 84
- "Tandy disc system is now available." (1981, November) 1
- "Tandy disc-o." (1981, August) 5

**EDUCATION**

- Betts, R. Bartley. "Work on your grammar." (1983, February) 48
- Blyn, Steve. "But, what did I get wrong?" (1983, March) 152
- Blyn, Steve. "Design programs to help children learn." (1982, July) 18
- Blyn, Steve. "Exercise your strings with this vowel checker." (1983, April) 96
- Blyn, Steve. "Good reinforcement means you can't frown at me." (1982, August) 41
- Blyn, Steve. "Make the difficulty level variable." (1982, September) 35
- Blyn, Steve. "Making a bar graph of your child's test scores." (1983, June) 28
- Blyn, Steve. "Proper grammar important in educational programs." (1982, October) 26
- Blyn, Steve. "Random often needs a helping hand." (1983, February) 14
- Blyn, Steve. "Sustain children's interest by expanding relevance." (1982, December) 56
- Blyn, Steve. "'User friendly' requires friendly users." (1983, January) 92
- Crooks, Robert L. "A common denominator for math study and ease." (1983, February) 102
- Davis, Susan P. "Fonhome-E.T. could have used this one." (1982, November) 82
- Faessler, Chuck. "Pop quiz: Name the 50 capitals." (1983, April) 34

- Hooper, David. "An educational U.S." (1982, March) 39
- Hooper, David. "Mathpal will teach youngsters." (1983, January) 111
- Kimmelman, Paul. "CoCo and the educational administrator." (1982, November) 105
- Kimmelman, Paul. "Education and the Color Computer." (1983, April) 224
- Kimmelman, Paul. "Education and the Color Computer." (1983, June) 232
- Kimmelman, Paul. "Furniture for the classroom computer." (1983, March) 24
- Kimmelman, Paul ; and Macali, David. "CoCo as an educational bargain." (1983, February) 124
- Kimmelman, Paul ; and Macali, David. "Establishing a CoCo educational network." (1983, January) 154
- Kimmelman, Paul ; and Macali, David. "Software in the classroom." (1982, December) 146
- Kretschmer, J. C. "Estimating reading difficulty sentence-by-sentence." (1983, June) 148
- Lester, Lane P. "An electronic gradebook." (1982, September) 8
- Lester, Lane P. "Illustrating lectures with graphics." (1983, January) 136
- Mir, Jorge. "TESTEM will help you prepare for final exams." (1982, May) 17
- Pesha, Ronald. "Spelling practice." (1983, March) 198
- Rumbant, C. A. "A graphic look at basic trigonometry." (1983, January) 175
- "Teacher's helper, student's friend." (1981, September) 4
- Wells, Geoff. "A new way to make words is here." (1982, September) 95

**GAMES**

- "Adventure report." (1982, December) 61
- Albrecht, Bob. "Creating characters for fun and adventure." (1983, February) 26
- Albrecht, Bob. "Roll those bones (and other characteristics)." (1983, March) 12
- Albrecht, Bob ; and Firedrake, George. "For these three friends the outcome's a bit dicey." (1982, December) 168
- Albrecht, Bob ; and Firedrake, George. "Let's venture into the world of let's pretend." (1982, September) 38
- Albrecht, Bob ; and Firedrake, George. "The mysterious and unpredictable RND." (1982, November) 37
- Albrecht, Bob ; and Firedrake, George. "RND command is one secret to good games." (1982, October) 46
- Albrecht, Bob ; and Firedrake, George. "Who is this one called CVCVC?" (1983, June) 234
- "Are you psychotic... psychic." (1981, September) 9
- "Aye, aye, aye --- my sky eye." (1982, March) 4
- Bain, Scott L. "An a-mazing game for your fun." (1982, April) 7
- "Battle the alpine aliens." (1982, August) 34
- Becker, Rob. "First Saturday in May." (1983, April) 28
- Bennett, Joseph E. ; and Laidlaw, C. E. "Parachute or free fall?" (1982, December) 76
- Clark, Gregory. "Sir Randolph of the Moors." (1983, January) 26



Delbourgo, T.; and Delbourgo, R. "Consequences from downunder." (1983, March) 110  
Ebbert, Jim. "Can you protect Starbase Alpha?" (1982, November) 101  
Fire Drake, George; and Albrecht, Bob. "Let's try fantasy role playing games." (1983, April) 226  
"For its — Gin, Gin, Gin." (1981, October) 9  
Frasysse, John W., Jr. "Homing in on a guided missile system." (1983, March) 154  
Frasysse, John W., Jr. "Let's go sailing." (1982, October) 76  
Frasysse, John W., Jr. "Rainbow roach." (1983, June) 38  
"Get ready to do battle near laser star." (1981, September) 1  
"Get that gobbler!" (1982, January) 10  
Goldberg, Morton. "Marquee de fin." (1983, February) 204  
"Helicopter battleground for you." (1981, October) 8  
Hine, Al. "Race the track." (1982, September) 60  
Hooper, David. "Here come the vipers." (1981, December) 5  
Hryzak, Wolfgang. "International ping-pong." (1982, September) 41  
"Invaders." (1982, February) 17  
"Julie's song —" (1982, April) 36  
Kelley, Robert. "Towers of Hanoi." (1982, November) 42  
Keys, Michael J. "Cheat at adventure." (1983, February) 99  
Kohn, Joseph. "A colorful game of draw: That's color poker." (1983, April) 162  
Kolar, Joseph. "Answer the Question 'what happens if...'" (1983, June) 255  
L'Hommedieu, Douglas C. "Hang 'em up." (1983, February) 40  
"Make your kids like the quiz kids." (1981, September) 14  
Mir, Jorge. "Advmaker makes adventures." (1982, August) 47  
Mir, Jorge. "Let's go on a simple Rainbow adventure." (1982, July) 9  
Montes, Martin S. "Supply water to thirsty urbanites with PIPELINE." (1983, June) 258  
Nolan, Bill. "Continuing your character record file." (1983, February) 179  
Nolan, Bill. "Create a character file program." (1983, January) 15  
Nolan, Bill. "Create character files with this 'finished' program." (1983, March) 202  
Nolan, Bill. "Demons in the dungeon? Let's see them bite." (1982, September) 22  
Nolan, Bill. "Dragons are nice folks, too — almost all 1440 of them!" (1982, August) 62  
Nolan, Bill. "Fantasy games." (1982, July) 27  
Nolan, Bill. "Here some new FRP routines." (1982, May) 23  
Nolan, Bill. "Keeping the loathsome in line (better monster management)." (1983, April) 170  
Nolan, Bill. "Make monsters from silicon — and use them here." (1982, October) 106  
Nolan, Bill. "Now a whole bag of dice." (1982, June) 38  
Nolan, Bill. "Pressed for time? Paint a dragon!" (1982, December) 50  
Nolan, Bill. "Slay your turkey with these 'duel' programs." (1982, November) 67  
Nolan, Bill. "Using DATA lines to cache your creatures." (1983, June) 124  
O'Donnell, Timothy. "Search for words—any words." (1982, December) 130  
Preble, Lawrence D. "Stay alive at Outpost Five." (1983, February) 34  
Reed, Jim. "Having an adventure with adventure." (1983, January) 20  
Reed, Jim. "Once again with adventure." (1983, February) 200  
Reid, Chris. "CoCo Crypto—a three-star puzzler." (1983, June) 132  
Ricketts, Gregory. "Dungeon adventure." (1983, January) 50  
Scerbo, Fred. "A 3-D type game to try." (1982, November) 8  
Scerbo, Fred; Doppert, Robert; and Haggerty, Dale. "Swamp Wars can win your croix de lily pad." (1982, June) 49  
Shelf, Carl. "Sub at 30 fathoms." (1983, March) 144  
Shorter, Ted. "Ice lander can be a slick run." (1982, June) 25  
"Shuffle off to cards — of course." (1982, January) 2  
Stewart, David A. "Can you deactivate the bomb?" (1983, March) 136

Sweat, David. "Get into the Hobbit of playing." (1983, January) 122  
"There is no escape from this space debris." (1982, July) 42  
Urban, John L. "Creating fantasy game characters with strength and wisdom." (1982, January) 6  
Urban, John L. "Generating a FRP character." (1982, February) 18  
Urban, John L. "Making CoCo help as an FRP referee." (1982, March) 32  
Urban, John L. "Random dice methods compared and illustrated." (1982, May) 44  
Urban, John L. "Random numbers make easy fun." (1981, December) 6  
Walrath, Del. "Let's learn how to do a number picking game." (1982, September) 15  
"Watch out for the wild, wild web." (1982, April) 37  
Wells, Geoff. "And now — haunted house adventure." (1983, February) 64  
Wells, Geoff. "Go adventuring with GAPAD." (1982, December) 98  
Wells, Geoff. "Go adventuring with GAPAD." (1983, January) 18  
Wells, Geoff. "Handy math drill." (1982, September) 82  
Wells, Geoff. "Once more we'll go rowing." (1982, November) 33  
White, Richard A. "Give us more vipers!" (1982, February) 26  
Wick, Gary. "Who wrote the Rainbow's first trivia game?" (1983, June) 16  
"Zelda and her days." (1981, December) 2

## GENERAL

"About the Rainbow seal." (1982, August) 33  
"Basketball statskeeper will have them bouncing along." (1981, November) 3  
Bauter, Curtis J. "CoCo cabinet." (1983, April) 36  
Bennett, Joseph E. "Build a desk for your CoCo." (1982, March) 16  
Bennett, Joseph E. "Chart your flow — and watch 'em go." (1982, February) 14  
Delbourgo, R. T. "Who goes on Random Walks." (1983, January) 130  
DiStefano, Tony. "How to reduce that RFI on your monitor." (1983, April) 146  
DiStefano, Tony. "Memories of the PROM." (1983, June) 72  
Fernold, John. "How healthy are you?" (1982, November) 124  
Hasenstaub, Theodore P. "Build a light pen." (1983, April) 90  
"How pretty it is to print pretty." (1982, February) 21  
James, Brian. "80C report from West Coast Computer Faire." (1982, May) 20  
Kolar, Joseph. "Let's share some of your useful hints." (1983, April) 200  
Kolar, Joseph. "Let's take 'Basic' training." (1982, December) 37  
Kolar, Joseph. "More organization: create a tape register." (1983, March) 132  
Kolar, Joseph. "Taking Basic training." (1983, January) 10  
Lengyel, David. "Half life of nuclear decay." (1983, March) 34  
Macali, David. "Peripherals for the Color Computer 'joystick dilemma.'" (1983, June) 196  
Mickle, Dan. "Predicting fallout." (1983, March) 40  
Morgan, Alan J. "How much memory?" (1982, January) 19  
Nelson, Tom. "Got a program? Get a market!" (1983, June) 164  
Nelson, Tom. "Legal discussion on the Color Computer." (1983, April) 56  
"Rainbow seal to help consumers." (1982, June) 28  
"Received and certified." (1983, April) 198  
"Received and certified." (1983, June) 147  
Reilly, Mike. "If it's not the 'F' board, how about the '285'?" (1983, June) 160  
Rosen, Bob. "Inside TDP." (1983, February) 154  
Rothermal, Bruce. "Dump to camera: Photographing your monitor." (1983, April) 88  
Schmidt, Jim. "Everything you wanted to know about hex." (1983, April) 178  
Searby, Sue. "Tecky yes." (1982, November) 62  
"Software theft." (1981, September) 2  
Speer, Mike. "A cat's heartbeats." (1982, November) 32  
Waclow, John. "Here is how to pick NFL winners this season." (1982, August) 54

Waclow, John. "Pick the winners in the NFL." (1982, July) 50  
Waclow, John. "80C picks the National Football League." (1982, June) 12  
White, Richard A. "Bits and bytes of Basic." (1983, January) 12  
White, Richard A. "Developing a program." (1983, June) 174  
White, Richard A. "How to form 80C user's groups." (1982, May) 27  
White, Richard A. "Well-defined variables produce clarity, conservation." (1983, February) 88  
Wilson, M. P. "An index to The Rainbow?" (1983, January) 126

## GRAPHICS

Barringer, James. "Dog-gone program." (1982, September) 78  
Bennett, Joseph E. "Get and Put: High-res movement." (1981, November) 10  
Curtis, H. Allen. "Getting more from Pmode 4." (1982, June) 42  
Curtis, H. Allen. "Shades of PMODEs 1 and 2 gives you even more colors." (1982, November) 78  
Dana, John W. "Moving graphics." (1982, December) 85  
Dana, John W. "Son of graphic traffic." (1983, March) 164  
Delbourgo, Bob. "3-D graph plotting of multiple variables." (1983, June) 116  
Delbourgo, D.; Delbourgo, R.; and Latner, Norman. "Two illusions." (two articles) (1983, March) 28  
Delbourgo, R. T.; and Delbourgo, D. "More moire— from downunder." (1982, November) 23  
Dershejmer, Rich. "The eyes have it." (1982, November) 142  
Endres, M. H. "Printing characters on the graphic screen." (1982, May) 8  
Foulke, Robert. "Random graphic fun." (1981, December) 8  
Franksen, Aaron. "Low resolution drawing." (1983, March) 166  
Germann, Karl. "This routine draws circles around the rest, randomly." (1983, March) 191  
Gray, T. "Make this handy reusable graphics grid." (1983, April) 73  
Hall, Chris. "Really combine graphics and text." (1982, November) 26  
Inman, Don. "Achieving motion with GET and PUT." (1983, January) 106  
Inman, Don. "High resolution graphics techniques are explained." (1982, December) 41  
Inman, Don. "Let's get serious shifting axes in quads I and IV." (1983, June) 90  
Inman, Don. "Now, let's make some regular polygons." (1983, April) 106  
Inman, Don. "Techniques for plotting screen graphs." (1983, February) 186  
Inman, Don. "Using graphics." (1983, March) 102  
Krikorian, Ed. "Create three-dimensional graphics with SAR27." (1983, January) 170  
Laessig, Mark. "Curvfitz is number cruncher of the first order." (1983, April) 234  
Lai, Stephen. "Three easy pieces: one animator's art." (1983, April) 188  
Lester, Lane P. "Screen-to-printer color graphics." (1983, March) 18  
"MN decoded." (1981, July) 3  
"Make the Color Computer live up to its name." (1982, August) 69  
"Motion picture programming (MPP)." (1982, March) 24  
"PUT and GET and random forms make unusual graphics." (1982, September) 32  
Plaxton, John. "Flashy program, by thunder." (1983, April) 16  
Pollard, Ed. "Now lookit that!" (1983, January) 164  
"Polygon again." (1982, February) 11  
Pouch, Arnold. "Motion picture programming—a program to run." (1982, May) 36  
Pouch, Arnold. "Motion picture programming — the details." (1982, April) 13  
Reid, Chris. "Beautiful Moire patterns." (1982, October) 74  
"What — more polygon." (1982, April) 10  
"Your video display generator and the PMODE4 colors." (1982, August) 39  
Ziniewicz, George. "Graphics? Here are two...by George!" (1982, November) 86



## HOME/HOBBY

- Bennett, Joseph E. "For all your secrets—the full Jarb-code program." (1982, May) 50  
 Boston, William. "Here's an easy way to place orders by mail." (1982, August) 19  
 Bruck, Bill. "Keep track with a mailing list." (1982, October) 86  
 "Checkbook balance." (1982, January) 3  
 Dooman, Bob. "Invitations made easy." (1983, January) 74  
 "An educational program for everyone." (1981, August) 8  
 Falk, Lawrence C. "Do your taxes on your COCO." (1982, March) 8  
 Falk, Lawrence C. "Prepare for tax time — easily." (1982, February) 2  
 Garrett, Ron. "Key your checks to accounts." (1982, October) 20  
 Hooper, David. "A pumpkin for your window." (1982, October) 104  
 "How's your day? Need biorhythm help?" (1981, November) 6  
 Lester, Lane P. "Render unto IRS." (1983, February) 18  
 "Make letterheads for correspondence." (1982, April) 47  
 Mosty, Mark S. "Color billbars help chart spending." (1982, April) 19  
 Posner, Judd. "Spectaculator statistics." (1983, February) 10  
 Ray, R. D. "Five year's worth of income tax." (1983, February) 148  
 Ridge, Herbert. "A calendar to keep track." (1982, October) 8  
 Rosen, Bob. "Title video tapes with CoCo." (1982, October) 128  
 "A self-mailer saves time and envelopes." (1982, April) 38  
 Sherrill, Sam. "Analysis of variance: A 'nova' for CoCo." (1983, March) 94  
 Sherwood, Francis. "How much will it cost to buy on time?" (1982, October) 70  
 Stumpf, Peter. "A Christmas Eve fireplace." (1982, December) 34  
 Trevor, A. B.; and Yahn, Charles. "X10 protocol theory: Home power control part 3." (1983, June) 98  
 Trevor, Alexander B. "Control your home." (1983, February) 160  
 Trevor, Alexander B. "Tick tock, CoCo clock." (1983, April) 20  
 Weide, Dennis H. "Let CoCo keep track of your utility bills." (1983, March) 64  
 White, Richard A. "Making Spectaculator strut its stuff." (1982, June) 31  
 Witham, Burton B., Jr. "CoCo knows all the callsigns." (1983, February) 110  
 Witham, Burton B., Jr. "Keep a Ham radio log." (1982, December) 124  
 Witham, Burton B., Jr. "A rapid logger for Hams." (1983, March) 180  
 Witham, Burton B., Jr. "A super duper for Hams." (1983, January) 80

## MUSIC

- Delbourgo, Bob. "A musical scale generator." (1983, June) 262  
 Konecky, Larry. "CoCo says repeat this tune." (1983, April) 218  
 Konecky, Larry. "Let's write some music." (1982, December) 66  
 "Music made easy." (1981, July) 2  
 Nolan, Sara. "Micro-maestro—using CoCo's PLAY statement." (1982, December) 10  
 Penrose, Paul. "PLAYing around with your 80C." (1982, July) 22

## PRINTER

- Bohne, Bill. "A FORMATR for the Gemini." (1983, June) 182  
 Chamberlain, Ross. "Graphics word processing." (1982, December) 136  
 Falk, Lawrence C. "Printers: Overview of some features." (1982, June) 21  
 Goebel, Kathy. "Make a logo." (1982, October) 50  
 Good, Steve. "Printer spooling will increase your throughput." (1983, June) 246  
 "Graphics printer." (1981, September) 13  
 "LP VII driver." (1981, July) 3  
 "Line printer conversion chart." (1983, June) 156

- "Printer status." (1981, August) 4  
 Schmidt, Jim. "Three printer utilities." (1982, September) 51  
 "Screen monitor." (1981, October) 7  
 Seary, Sue. "The serial/parallel syndrome: what's that?" (1983, January) 76  
 Snyder, Dennis. "Building a Color Computer to EPSON MX printer interface." (1983, June) 20  
 Steyer, David. "Non-graphic printer graphics." (1982, September) 72  
 Szlucha, Thomas F. "Using the block graphics of the Okidata 82A." (1983, June) 250  
 White, Richard A. "Print it bigger than you can." (1983, June) 198

## REVIEWS

- "Across the Rubicon." (1982, December) 141  
 "Addition concepts." (1983, February) 77  
 "Adventure 3-pak." (1982, August) 76  
 "Alpha-draw." (1982, August) 61  
 "Alphabet soup." (1983, February) 192  
 "Ancient Wisdom." (1982, September) 44  
 "Android attack." (1983, April) 232  
 "Animated Hangman." (1981, December) 19  
 "Assembly language graphics (book)." (1983, February) 94  
 "Astro Blast." (1982, August) 74  
 "Astrology." (1982, October) 100  
 "Auto run." (1982, June) 52  
 "Autoterm." (1983, June) 118  
 "Avenger." (1982, November) 52  
 "BASIC programming primer." (1983, June) 220  
 "BT1000 Interface." (1983, January) 198  
 "Banner." (1983, June) 223  
 "Bar zapper." (1983, April) 136  
 "Baseball." 112  
 "Basic Aid." (1982, August) 27  
 "The Basic Handbook." (1982, July) 47  
 "Battle of Gettysburg." (1983, February) 54  
 "Battlefleet." (1982, January) 15  
 "Berserk." (1982, March) 25  
 "Beyond the Cimeeon Moon." (1983, April) 152  
 "Big Num." (1982, November) 54  
 "Bigfoot." (1983, March) 200  
 "Biorhythm and Mine Field." (1982, February) 10  
 "Biorhythm." (1982, June) 52  
 "Bird attack." (1983, February) 178  
 "Blackjack." (1982, June) 66  
 "Blackjack." (1983, February) 184  
 "Brickaway." (1982, February) 30  
 "Brickout/Word Guess." (1982, March) 19  
 "Bridge tutor I." (1983, April) 148  
 "Bug Chase." (1982, September) 90  
 "Bulletin Board Software." (1982, December) 142  
 "Bwindo." (1982, August) 27  
 "A Byte of Color Basic." (1982, October) 27  
 "CBUG monitor." (1981, August) 3  
 "CC calc." (1983, February) 62  
 "CC mailer." (1983, February) 158  
 "CCEAD." (1983, February) 170  
 "CCPilot." (1982, May) 14  
 "CChello." (1983, March) 120  
 "CCube." (1982, November) 116  
 "CCForth." (1982, December) 148  
 "CGP II." (1983, June) 230  
 "CGP-115 Printer." (1982, December) 168  
 "CPP." (1983, June) 172  
 "Calixto Island." (1982, May) 35  
 "Card game." (1983, June) 152  
 "Carry." (1983, June) 195  
 "Cassette Caddy." (1982, September) 49  
 "Cassette Holder." (1983, January) 147  
 "Catch 'em." (1983, April) 72  
 "Cave Hunter." (1982, April) 25  
 "Cer-Comp disk system." (1982, May) 34  
 "Cer-comp disk system." (1982, July) 20  
 "Checking account." (1983, February) 169  
 "Chromasette Magazine." (1981, December) 9  
 "Circus Adventure." (1982, March) 36  
 "Clock." (1982, October) 113  
 "Clock." (1983, March) 150  
 "Cmailist." (1982, May) 21  
 "CoCo Cassette." (1982, October) 96  
 "CoCo Cooler." (1982, December) 39  
 "CoCo Slots." (1983, January) 196  
 "CoCo-jot." (1983, March) 114  
 "Co-Res Editor/Assembler." (1982, October) 30

- "Co-existence." (1983, June) 219  
 "Color Basic and Extended Basic System Reference Card." (1982, April) 31  
 "Color Computer Graphics." (1982, August) 39  
 "Color Enhancer." (1982, October) 28  
 "Color FORTH." (1982, December) 148  
 "Color Invaders." (1982, April) 28  
 "Color Meteoroids." (1981, November) 7  
 "Color Scarfman." (1983, January) 189  
 "Color Space Invaders." (1981, October) 9  
 "Color Text." (1983, June) 226  
 "Color Zap." (1982, September) 44  
 "Colorcom/e." (1982, February) 31  
 "Colorforth." (1982, May) 29  
 "Colorhythm." (1982, August) 61  
 "Colorkit." (1982, October) 114  
 "Colorpede." (1982, December) 144  
 "Colorshow." (1982, December) 171  
 "Colorterm." (1982, March) 29  
 "The Composer." (1983, June) 192  
 "Compumind/Jackpot." (1982, January) 16  
 "Computerware's 32K upgrade." (1982, February) 9  
 "Compuvoice." (1982, June) 11  
 "Conflict." (1981, October) 2  
 "Conquest of Kzirglia." (1983, April) 105  
 "Cprint." (1981, December) 11  
 "Craps." (1982, December) 112  
 "Creatavador." (1982, May) 15  
 "Crosswords." (1983, June) 224  
 "Crystal revenge." (1983, April) 160  
 "DMP 200." (1983, June) 210  
 "Dancing Devil." (1982, April) 35  
 "Database Manager II." (1983, June) 242  
 "Date-o-base calendar." (1982, June) 9  
 "Death star." (1983, April) 150  
 "Defense." (1983, March) 142  
 "Dice." (1983, February) 198  
 "Disk ColorCom/E." (1982, November) 58  
 "Disk Data Handler." (1982, October) 110  
 "Disk Doctor." (1982, June) 27  
 "Disk Double Entry." (1983, January) 70  
 "Disk Interface." (1982, September) 20  
 "Disk Script." (1982, November) 25  
 "Disk Spectaculator." (1982, November) 25  
 "Donkey King." (1983, January) 152  
 "Doodlebug." (1983, January) 162  
 "Double Stick interface." (1983, March) 199  
 "Doubleback." (1983, April) 72  
 "Dragonquest." (1982, December) 162  
 "Dungeon Maze." (1982, November) 55  
 "Dunkey Munkey." (1983, January) 152  
 "Eight-bit bartender." (1983, April) 208  
 "El Casino." (1982, April) 25  
 "El Diablero." (1982, November) 112  
 "Electricity consumption monitor." (1983, April) 26  
 "Enchanted Forest." (1982, December) 74  
 "Endicott Joysticks." (1982, October) 112  
 "Epson interface." (1983, June) 88  
 "Escape." (1982, November) 66  
 "Exercise Planner." (1982, July) 26  
 "Expansion Interface." (1983, January) 198  
 "FH Flex." (1982, October) 64  
 "FLEX revisited." (1983, January) 160  
 "Fantasy Gamer's Package." (1982, August) 40  
 "File cabinet." (1983, April) 134  
 "Final countdown." (1983, March) 90  
 "Five exciting games." (1983, February) 86  
 "Flight." (1983, February) 182  
 "Football." (1982, June) 23  
 "Foxygraf." (1983, February) 84  
 "Frog Man." (1982, December) 173  
 "Frog Trek." (1983, March) 197  
 "Fundgraf." (1983, January) 187  
 "GSPR." (1982, May) 14  
 "Galax Attax." (1982, September) 90  
 "Galloping gamblers." (1982, January) 20  
 "Game Pak 2." (1983, January) 163  
 "Game Show." (1983, January) 174  
 "Game Writer." (1982, December) 84  
 "Gangbusters." (1982, December) 161  
 "Gator Zone." (1982, February) 8  
 "Gauntlet." (1982, March) 18  
 "Gazon." (1983, April) 240  
 "Gemini 10/15." (1983, June) 109  
 "Geography Pack." (1982, September) 49  
 "Ghostmania." (1983, March) 116  
 "Golf (Aardvark)." (1982, November) 114  
 "Golf (Mix)." (1982, November) 114  
 "Graph Zapper." (1982, December) 53



"Graph-16/32." (1982, December) 75  
 "The Great Word Game." (1982, May) 13  
 "Hebrew bulletin board." (1983, June) 180  
 "Home buyer's analyser." (1983, March) 52  
 "Homebase." (1983, March) 36  
 "Household Expense Manager." (1982, December) 36  
 "Humbug." (1982, May) 28  
 "INSIMB." (1983, June) 170  
 "Inspector Clueseau." (1983, March) 173  
 "Intergalactic Force." (1982, December) 49  
 "Invader's Revenge." (1982, November) 114  
 "Invaders." (1982, February) 17  
 "Inventory Control." (1982, September) 71  
 "JARBCODE." (1981, August) 5  
 "JARB Joystick." (1982, August) 25  
 "JARB Memory Kit." (1982, December) 92  
 "Joystick LED kit." (1983, February) 36  
 "Jumps." (1983, January) 164  
 "Jungle Trek." (1982, September) 43  
 "Kamikaze." (1983, April) 42  
 "Katerpillar." (1982, July) 41  
 "Keys to the Wizard." (1982, October) 63  
 "Kosmic Kamakaze." (1981, December) 11  
 "LEM, Pirate Adventure, Darts." (1982, July) 8  
 "LLIST-rite." (1983, April) 204  
 "LOGO." (1982, December) 88  
 "Labyrinth." (1982, May) 29  
 "Lander." (1982, August) 37  
 "Las Vegas weekend." (1983, February) 100  
 "Laser Tank Duel." (1982, December) 174  
 "Laser Tank." (1983, January) 159  
 "Light pen fun-pak." (1983, February) 32  
 "Light pen." (1982, April) 31  
 "Lowerkit, LCA-47." (1982, June) 62  
 "ML Rabbit." (1982, March) 37  
 "MPP tutorial." (1982, July) 64  
 "Macro Assembler." (1982, October) 30  
 "Macro 80C." (1982, October) 30  
 "Madam Rosa's parlor." (1982, November) 66  
 "Mars Adventure." (1982, August) 37  
 "Master Control." (1981, November) 4  
 "Master disk system." (1983, February) 77  
 "Match-it." (1983, March) 82  
 "Math Drill." (1982, September) 20  
 "Math Tutor/Spelling Teacher." (1982, September) 91  
 "Mathpac I." (1982, September) 70  
 "Maze race." (1983, February) 168  
 "Megabug." (1983, January) 158  
 "Micro Script." (1982, December) 156  
 "Micro-doc." (1983, March) 150  
 "Microworks RAM upgrade." (1981, September) 19  
 "Millborn." (1983, February) 159  
 "Minefield." (1983, March) 124  
 "Missile Barrage." (1983, January) 183  
 "Mission: Empire." (1982, September) 88  
 "Modem I." (1982, November) 118  
 "Money Minder II." (1982, April) 35  
 "Money." (1983, January) 154  
 "Monsters & Magic." (1983, June) 222  
 "Moon Lander." (1982, March) 27  
 "Moptown." (1983, January) 183  
 "Ms. Nibbler." (1983, March) 223  
 "Music." (1982, July) 39  
 "Mystery Maze." (1982, July) 49  
 "Name that song." (1982, May) 42  
 "New Talk." (1982, June) 11  
 "Nibbler." (1983, March) 223  
 "Offenders." (1982, November) 52  
 "Pac Attack." (1982, March) 37  
 "Pac Droids." (1982, November) 49  
 "Panostyk." (1983, April) 214  
 "Paper Porter." (1982, June) 54  
 "Pigskin Predictions." (1982, October) 102  
 "Pinball." (1983, January) 158  
 "Planet Invasion." (1982, November) 52  
 "Poker." (1982, October) 12  
 "Poltergeist." (1983, February) 82  
 "Preread package." (1983, March) 172  
 "Preschool Pak." (1982, September) 70  
 "Preschool packs 1, 2, 3." (1983, April) 192  
 "Printer Stand." (1983, January) 147  
 "Pro-color file." (1983, June) 208  
 "Professional keyboard." (1983, March) 20  
 "Protectors." (1982, November) 52  
 "Protectors." (1983, April) 102  
 "Pumpkin Adventure." (1982, October) 28  
 "Qtax-82." (1983, February) 180  
 "Quad Data Base." (1982, October) 110  
 "Quest." (1982, April) 25

"RAM Slam." (1982, September) 88  
 "ROML." (1983, February) 197  
 "RS-232 expansion cable." (1982, July) 47  
 "RS232 Switcher." (1982, November) 89  
 "Rail Runner." (1982, December) 173  
 "Random Basic." (1982, September) 36  
 "Reading Two-Pak." (1982, September) 17  
 "Recipe File." (1982, November) 72  
 "Red Baron." (1982, June) 17  
 "Remoterm." (1983, March) 170  
 "Reversi." (1982, December) 173  
 "Revolution." (1983, March) 138  
 "Robot battle." (1983, April) 140  
 "Roman Checkers." (1982, November) 55  
 "RunCalc." (1982, October) 113  
 "SAM Saver." (1982, November) 58  
 "SDS80C." (1981, September) 7  
 "SIGMON." (1981, August) 6  
 "SISI." (1982, June) 23  
 "S.E.C.S." (1981, September) 16  
 "Saspus." (1982, August) 25  
 "Scepter of Kzjrgla." (1982, May) 15  
 "School Maze." (1982, August) 53  
 "Semi-draw." (1982, December) 144  
 "Serial/parallel converter." (1981, November) 5  
 "Shark treasure." (1983, April) 144  
 "Silly Syntax." (1982, February) 21  
 "Sky-defense." (1982, August) 76  
 "Small business accounting package." (1983, January) 70  
 "Smart Modem." (1982, November) 118  
 "Solo Pool." (1983, January) 162  
 "The Solution." (1982, June) 8  
 "Songbook." (1982, November) 54  
 "Soooper pac." (1983, June) 195  
 "Soundsources." (1982, June) 11  
 "Space Invaders." (1982, June) 8  
 "Space War." (1981, December) 14  
 "Space race." (1983, April) 24  
 "Spanish one." (1983, April) 40  
 "Speak up!" (1983, April) 132  
 "Spectaculator." (1982, March) 43  
 "Spectrum paddle." (1983, January) 134  
 "Spectrum stick." (1982, October) 112  
 "Spectrum light pen." (1983, February) 32  
 "Spectrum switcher." (1983, April) 207  
 "Spell 'n fix." (1982, July) 26  
 "Spider Attack." (1983, January) 160  
 "Spider." (1983, January) 160  
 "Stagecoach." (1983, June) 68  
 "Star Trench Warfare." (1983, January) 168  
 "Star-DOS." (1983, February) 60  
 "Starfire." (1982, November) 52  
 "Stars." (1982, October) 27  
 "Starship Chameleon." (1982, July) 41  
 "Starship Hercules." (1983, March) 81  
 "Startrek." (1982, October) 96  
 "Stinger." (1983, March) 134  
 "Stock Market Analyzer." (1982, July) 48  
 "Stress evaluator." (1983, March) 190  
 "Stripper." (1983, February) 182  
 "Sub Mission." (1983, January) 165  
 "Super 'Color' disk zap." (1983, April) 138  
 "Super pro keyboard." (1983, April) 81  
 "Synther-7." (1983, April) 156  
 "TIMS." (1982, November) 41  
 "TP-1 printer." (1983, February) 86  
 "TRS-80 Color Basic." (1982, September) 90  
 "Talk Processor." (1982, November) 106  
 "Talking Graphic Demo." (1982, March) 18  
 "Telewriter Disk." (1982, December) 156  
 "Telewriter-64." (1983, June) 216  
 "Text pro II." (1983, February) 176  
 "Tiny Compiler." (1982, September) 89  
 "Top Stix." (1983, March) 199  
 "Tower Castle Adventure." (1982, December) 154  
 "Tower of fear." (1983, March) 124  
 "Trek 16." (1982, October) 96  
 "Trek 80C." (1982, October) 96  
 "UP-1." (1983, January) 121  
 "Venturer." (1982, June) 40  
 "Video Interface Kit." (1982, November) 54  
 "Viking." (1982, July) 64  
 "Virtual memory loader." (1983, February) 198  
 "Wall Street." (1983, March) 20  
 "War Kings." (1982, May) 33  
 "Warrior and the Wizard." (1983, February) 180  
 "Wet T-shirt contest." (1983, February) 92  
 "Wordclone." (1982, December) 156

"Words about things." (1983, June) 162  
 "Words that act." (1983, June) 162  
 "Worksaver." (1982, December) 82  
 "World History." (1982, September) 20  
 "Wormhole." (1983, March) 216  
 "X-pad." (1983, January) 84  
 "Zaksund." (1983, June) 154  
 "Zarconian marble." (1983, June) 88  
 "Zaxxon." (1983, June) 154  
 "101 Hints and Tricks." (1982, October) 100  
 "20000 Leagues." (1982, November) 56  
 "3D tic tac toe." (1983, April) 52  
 "3-d Brickaway." (1982, November) 84  
 "64K screen expander." (1983, April) 100  
 "64K upgrade takes a bit of know-how." (1982, August) 33  
 "80C disassembler." (1981, October) 4

## SIMULATION

Franklin, William G. "Flying the 'Sopwith with CoCo —an instrument flight simulation in real time." (1983, June) 54  
 French, Paul. "Iowa lemonade." (1983, April) 60  
 Latham, Chris ; and Erickson, John. "Micro-meltdown: A nuclear reactor simulation." (1983, April) 112

## UTILITY

"All in one." (1981, September) 17  
 Alsop, B. H. "D-board 64K upgrade." (1983, March) 100  
 Blatt, Ted. "Change those print's to print -2's." (1983, February) 207  
 Blyn, Steve. "The 'initial' experience can be child's play!" (1982, November) 18  
 "CPU speedup" (1981, July) 3  
 Clements, William C., Jr. "Install a chip-saving 'power-on' light." (1983, April) 18  
 Clements, William C., Jr. "Rockin' through ROM." (1982, August) 29  
 Cromley, David A. "Check your TV alignment." (1983, March) 201  
 Davis, Gary A. "Make your REMS stand out." (1982, March) 12  
 Deahl, Kenneth G. "Flow gently, sweet listing." (1983, February) 74  
 DiStefano, Tony. "Construct a finger-saving circuit for your joystick." (1983, February) 156  
 DiStefano, Tony. "Green on black video: 'eye friendly' conversion." (1983, March) 176  
 DiStefano, Tony. "High speed POKE has effect on CoCo hardware." (1983, January) 78  
 Diercks, Wayne A. "Pilfering in low memory." (1982, February) 1  
 Diercks, Wayne A. "You and your two-timin' CPU." (1982, March) 20  
 Downard, Dan. "The Rainbug monitor." (1983, April) 44  
 Downard, Dan. "Rainbug redux." (1983, June) 264  
 Downard, Dan. "The rewards of non-standard interfacing." (1983, February) 118  
 "Driver backup." (1981, August) 6  
 Ebbert, Jim. "A Mini-calc program." (1982, October) 60  
 Falk, Lawrence C. "Converting programs to 80C." (1982, August) 79  
 "A form of Csave?" (1981, December) 9  
 Gauvreau, Ray. "Tie an ASCII border 'round CoCo." (1983, April) 104  
 Hall, Mike. "Right justify numbers." (1983, April) 77  
 Hands, Lester. "Let's look at memory." (1982, December) 54  
 Hasenstaub, Theodore P. "Make a hex pad loader." (1983, January) 143  
 Kolar, Joseph. "Let's organize that jumble of tapes." (1983, February) 56  
 Kolar, Joseph. "On printing alphanumeric in eight directions." (1982, December) 62  
 Krankoski, Richard. "Paging down memory land: It may look like garbage, but it's good." (1983, April) 82  
 Lewandowski, Dennis S. "Assembly corner: Let's end those typing errors once and for all." (1983, January) 95  
 Lishnak, Pat. "Sort numeric arrays fast with machine language." (1982, August) 9  
 Mir, Jorge. "The latest program? Here's a dating system." (1983, February) 58  
 Mir, Jorge. "Machine tape finder/saver." (1981, December) 12

Mir, Jorge. "Save ML programs to your disk." (1982, April) 42  
 Mir, Jorge. "Universal data file." (1982, June) 57  
 Mir, Jorge. "Videoprinter." (1981, October) 3  
 Mir, Jorge. "64K conversion? Now what?" (1983, January) 166  
 Morgan, Alan J. "The famous speedup poke in fine detail." (1982, May) 32  
 Morgan, Alan J. "Synchronizing with your SAM chip." (1982, July) 24  
 Morgan, Alan J. "Videoprinter." (1981, October) 3  
 Moses, Ray. "Stars fall on 80C." (1982, June) 64  
 Mummaw, Ron. "Using VARPTR, Basic's hidden command." (1983, June) 110  
 Nolan, Bill. "Let's call JOYIN to learn ROM call technique." (1982, August) 8  
 Odneal, Steve. "FLEX can be flexible." (1982, September) 58  
 Poulin, Edgar. "Offset easy." (1983, April) 172  
 Preble, Lawrence D. "FLEX system is powerful addition to world of 80C." (1982, August) 32  
 Provost, James. "Keytones help input." (1983, April) 77  
 Ray, J. D. "Spruce up your tapes with this cassette label print program." (1983, June) 30  
 "Really using print using." (1981, October) 5  
 Reeves, Mark. "An 8-bit driver for Basic use." (1982, April) 41  
 "Reference utilities." (1982, August) 74  
 "Rem-d-leet." (1982, January) 21  
 Roberts, R. N. "Control your screen." (1983, March) 84  
 "Rompak backup." (1981, December) 15  
 Rosen, Bob. "This will program your keys on Professional Keyboard." (1983, June) 80  
 Roslund, Charles J. "Auto key repeat." (1982, September) 47  
 Roslund, Charles J. "Format your LLISTings with FLIST." (1982, December) 86  
 Roslund, Charles J. "Protect your screen from the ravages of scrolling with this machine language scroll protection utility." (1982, November) 46  
 Roslund, Charles J. "Speed up Basic with ML injections." (1983, January) 118  
 Samm, Hubert E., Jr. "Want a workhorse editor? Here's Mr. Ed." (1983, June) 140  
 Schroeder, Herbert. "DOS 'detach' saves wear and tear." (1983, March) 54  
 "Screen printer." (1981, August) 7  
 Seaby, Sue. "What's a monitor?" (1983, March) 174  
 Steyer, David. "Sign up and have a Banner day." (1983, January) 190  
 Sullivan, Steve. "A catalog for your tape." (1983, February) 96  
 "Thanks for the memories." (1981, August) 4  
 "Times square header." (1981, November) 5  
 "Turn off that motor—fast." (1982, February) 30  
 "Using the editor." (1981, August) 7  
 Weiss, Arnold. "Unidatfl revisited?" (1982, December) 114  
 "Wherezitat???" (1982, March) 19  
 White, Richard A. "Let's look at keyboard input." (1983, March) 192

## WORD PROCESSING

Becker, Barry. "A simple word processor." (1982, November) 138  
 Falk, Lawrence C. "Three new word processors offer a variety of features." (1982, April) 33  
 Falk, Lawrence C. "Word processing—A comparison of four different systems." (1982, January) 1  
 Lewandowski, Dennis S. "Assembly corner: Be nice to your printer—give it this AL word processor." (1983, June) 76  
 "Line justifier." (1981, August) 1  
 Millican, Oscar. "A simple word processor." (1982, May) 6  
 "Text editor - word processor." (1981, September) 3  
 "Word processor." (1981, July) 4

## AUTHORS

Albrecht, Bob. "Creating characters for fun and adventure." (1983, February) 26  
 Albrecht, Bob. "Roll those bones (and other characteristics)." (1983, March) 12  
 Albrecht, Bob ; and Firedrake, George. "For these three friends the outcome's a bit dicey." (1982, December) 168

Albrecht, Bob ; and Firedrake, George. "Let's venture into the world of let's pretend." (1982, September) 38  
 Albrecht, Bob ; and Firedrake, George. "The mysterious and unpredictable RND." (1982, November) 37  
 Albrecht, Bob ; and Firedrake, George. "RND command is one secret to good games." (1982, October) 46  
 Albrecht, Bob ; and Firedrake, George. "Who is this one called CVCVC?" (1983, June) 234  
 Alsop, B. H. "D-board 64K upgrade." (1983, March) 100  
 Bain, Scott L. "An a-mazing game for your fun." (1982, April) 7  
 Barringer, James. "Dog-gone program." (1982, September) 78  
 Bauter, Curtis J. "CoCo cabinet." (1983, April) 36  
 Becker, Barry. "A simple word processor." (1982, November) 138  
 Becker, Rob. "First Saturday in May." (1983, April) 28  
 Bennett, Joseph E. "Build a desk for your CoCo." (1982, March) 16  
 Bennett, Joseph E. "Chart your flow — and watch 'em go." (1982, February) 14  
 Bennett, Joseph E. "For all your secrets—the full Jarbcode program." (1982, May) 50  
 Bennett, Joseph E. "Get and Put: High-res movement." (1981, November) 10  
 Bennett, Joseph E. ; and Laidlaw, C. E. "Parachute or free fall?" (1982, December) 76  
 Betts, R. Bartley. "Work on your grammar." (1983, February) 48  
 Blatt, Ted. "Change those print's to print -2's." (1983, February) 207  
 Blyn, Steve. "But, what did I get wrong?" (1983, March) 152  
 Blyn, Steve. "Design programs to help children learn." (1982, July) 18  
 Blyn, Steve. "Exercise your strings with this vowel checker." (1983, April) 96  
 Blyn, Steve. "Good reinforcement means you can't frown at me." (1982, August) 41  
 Blyn, Steve. "The 'initial' experience can be child's play!" (1982, November) 18  
 Blyn, Steve. "Make the difficulty level variable." (1982, September) 35  
 Blyn, Steve. "Making a bar graph of your child's test scores." (1983, June) 28  
 Blyn, Steve. "Proper grammar important in educational programs." (1982, October) 26  
 Blyn, Steve. "Random often needs a helping hand." (1983, February) 14  
 Blyn, Steve. "Sustain children's interest by expanding relevance." (1982, December) 56  
 Blyn, Steve. " 'User friendly' requires friendly users." (1983, January) 92  
 Bohne, Bill. "A FORMATR for the Gemini." (1983, June) 182  
 Boston, William. "Here's an easy way to place orders by mail." (1982, August) 19  
 Bruck, Bill. "Keep track with a mailing list." (1982, October) 86  
 Chamberlain, Ross. "Graphics word processing." (1982, December) 136  
 Clark, Gregory. "Sir Randolph of the Moors." (1983, January) 26  
 Clements, William C., Jr. "Install a chip-saving 'power-on' light." (1983, April) 18  
 Clements, William C., Jr. "Rockin' through ROM." (1982, August) 29  
 Cromley, David A. "Check your TV alignment." (1983, March) 201  
 Crooks, Robert L. "A common denominator for math study and ease." (1983, February) 102  
 Curtis, H. Allen. "Getting more from Pmode 4." (1982, June) 42  
 Curtis, H. Allen. "Shades of PMODEs 1 and 2 gives you even more colors." (1982, November) 78  
 Dana, John W. "Moving graphics." (1982, December) 85  
 Dana, John W. "Son of graphic traffic." (1983, March) 164  
 Davis, Gary A. "Make your REMS stand out." (1982, March) 12  
 Davis, Susan P. "Fonehome-E.T. could have used this one." (1982, November) 82  
 Deahl, Kenneth G. "Flow gently, sweet listing." (1983, February) 74  
 Delbourgo, Bob. "A musical scale generator." (1983, June) 262  
 Delbourgo, Bob. "3-D graph plotting of multiple variables." (1983, June) 116  
 Delbourgo, D. ; Delbourgo, R. ; and Latner, Norman. "Two illusions." (two articles) (1983, March) 28

Delbourgo, R. T. "Who goes on Random Walks." (1983, January) 130  
 Delbourgo, R. T. ; and Delbourgo, D. "More moire—from downunder." (1982, November) 23  
 Delbourgo, R. T. ; and Delbourgo, R. "Consequences from downunder." (1983, March) 110  
 Dersheimer, Rich. "The eyes have it." (1982, November) 142  
 DiStefano, Tony. "Construct a finger-saving circuit for your joystick." (1983, February) 156  
 DiStefano, Tony. "Green on black video: 'eye friendly' conversion." (1983, March) 176  
 DiStefano, Tony. "High speed POKE has effect on CoCo hardware." (1983, January) 78  
 DiStefano, Tony. "How to reduce that RFI on your monitor." (1983, April) 146  
 DiStefano, Tony. "Memories of the PROM." (1983, June) 72  
 Diercks, Wayne A. "Pilfering in low memory." (1982, February) 1  
 Diercks, Wayne A. "You and your two-timin' CPU." (1982, March) 20  
 Dooman, Bob. "Invitations made easy." (1983, January) 74  
 Downard, Dan. "The Rainbug monitor." (1983, April) 44  
 Downard, Dan. "Rainbug redux." (1983, June) 264  
 Downard, Dan. "The rewards of non-standard interfacing." (1983, February) 118  
 Downard, Dan. "Smarts for a dumb terminal." (1983, March) 160  
 Dudgeon, Jim ; and Dudgeon, Michael. "Videotex to disk." (1982, February) 11  
 Ebbert, Jim. "Can you protect Starbase Alpha?" (1982, November) 101  
 Ebbert, Jim. "A Mini-calc program." (1982, October) 60  
 Endres, M. H. "Printing characters on the graphic screen." (1982, May) 8  
 Ericson, Robert W. "Building Spectaculator shells." (1983, April) 74  
 Faessler, Chuck. "Pop quiz: Name the 50 capitals." (1983, April) 34  
 Falk, Lawrence C. "Converting programs to 80C." (1982, August) 79  
 Falk, Lawrence C. "Do your taxes on your COCO." (1982, March) 8  
 Falk, Lawrence C. "Prepare for tax time — easily." (1982, February) 2  
 Falk, Lawrence C. "Printers: Overview of some features." (1982, June) 21  
 Falk, Lawrence C. "A tale of two discs." (1981, December) 3  
 Falk, Lawrence C. "Three new word processors offer a variety of features." (1982, April) 33  
 Falk, Lawrence C. "Word processing—A comparison of four different systems." (1982, January) 1  
 Fernold, John. "How healthy are you?" (1982, November) 124  
 Firedrake, George ; and Albrecht, Bob. "Let's try fantasy role playing games." (1983, April) 226  
 Foulke, Robert. "Random graphic fun." (1981, December) 8  
 Franklin, William G. "Flying the 'Sopwith with CoCo — an instrument flight simulation in real time." (1983, June) 54  
 Franksen, Aaron. "Low resolution drawing." (1983, March) 166  
 Fraysse, John W., Jr. "Homing in on a guided missile system." (1983, March) 154  
 Fraysse, John W., Jr. "Let's go sailing." (1982, October) 76  
 Fraysse, John W., Jr. "Rainbow roach." (1983, June) 38  
 French, Paul. "Iowa lemonade." (1983, April) 60  
 Garrett, Ron. "Key your checks to accounts." (1982, October) 20  
 Garrett, Ron. "Set up for accounts receivable." (1982, October) 118  
 Garrett, Ron. "Want some money? Send out a statement." (1982, November) 98  
 Gauvreau, Ray. "Tie an ASCII border 'round CoCo." (1983, April) 104  
 Germann, Karl. "This routine draws circles around the rest, randomly." (1983, March) 191  
 Goebel, Kathy. "Make a logo." (1982, October) 50  
 Goldberg, Morton. "Marquee de fin." (1983, February) 204  
 Good, Steve. "Printer spooling will increase your throughput." (1983, June) 246  
 Gray, T. "Make this handy reusable graphics grid." (1983, April) 73



- Hall, Chris. "Really combine graphics and text." (1982, November) 26
- Hall, Mike. "Right justify numbers." (1983, April) 77
- Hands, Lester. "Let's look at memory." (1982, December) 54
- Hardy, Harry. "Data communications and your Color Computer." (1983, April) 78
- Hardy, Harry. "Data communications and your Color Computer." (1983, June) 240
- Hasenstaub, Theodore P. "Make a hex pad loader." (1983, January) 143
- Hasenstaub, Theodore P. "Build a light pen." (1983, April) 90
- Hefter, Martin. "Living with one disk." (1983, April) 174
- Hine, Al. "Race the track." (1982, September) 60
- Hooper, David. "An educational U.S." (1982, March) 39
- Hooper, David. "Here come the vipers." (1981, December) 5
- Hooper, David. "Mathpal will teach youngsters." (1983, January) 111
- Hooper, David. "A pumpkin for your window." (1982, October) 104
- Hryzak, Wolfgang. "International ping-pong." (1982, September) 41
- Inman, Don. "Achieving motion with GET and PUT." (1983, January) 106
- Inman, Don. "High resolution graphics techniques are explained." (1982, December) 41
- Inman, Don. "Let's get serious shifting axes in quads I and IV." (1983, June) 90
- Inman, Don. "Now, let's make some regular polygons." (1983, April) 106
- Inman, Don. "Techniques for plotting screen graphs." (1983, February) 186
- Inman, Don. "Using graphics." (1983, March) 102
- James, Brian. "80C report from West Coast Computer Faire." (1982, May) 20
- Kelley, Robert. "Towers of Hanoi." (1982, November) 42
- Keyes, Michael J. "Cheat at adventure." (1983, February) 99
- Kimmelman, Paul. "CoCo and the educational administrator." (1982, November) 105
- Kimmelman, Paul. "Education and the Color Computer." (1983, April) 224
- Kimmelman, Paul. "Education and the Color Computer." (1983, June) 232
- Kimmelman, Paul. "Furniture for the classroom computer." (1983, March) 24
- Kimmelman, Paul; and Macali, David. "CoCo as an educational bargain." (1983, February) 124
- Kimmelman, Paul; and Macali, David. "Establishing a CoCo educational network." (1983, January) 154
- Kimmelman, Paul; and Macali, David. "Software in the classroom." (1982, December) 146
- Knight, Glenn B. "Power of attorney." (1983, March) 56
- Kohn, Joseph. "A colorful game of draw: That's color poker." (1983, April) 162
- Kolar, Joseph. "Answer the Question 'what happens if...'" (1983, June) 255
- Kolar, Joseph. "Let's organize that jumble of tapes." (1983, February) 56
- Kolar, Joseph. "Let's share some of your useful hints." (1983, April) 200
- Kolar, Joseph. "Lets take 'Basic' training." (1982, December) 37
- Kolar, Joseph. "More organization: create a tape register." (1983, March) 132
- Kolar, Joseph. "On printing alphanumerics in eight directions." (1982, December) 62
- Kolar, Joseph. "Taking Basic training." (1983, January) 10
- Konecky, Larry. "CoCo says repeat this tune." (1983, April) 218
- Konecky, Larry. "Let's write some music." (1982, December) 66
- Krankoski, Richard. "Paging down memory land: It may look like garbage, but it's good." (1983, April) 82
- Kretschmer, J. C. "Estimating reading difficulty sentence-by-sentence." (1983, June) 148
- Krikorian, Ed. "Create three-dimensional graphics with SAR27." (1983, January) 170
- L'Hommedieu, Douglas C. "Hang 'em up." (1983, February) 40
- Laessig, Mark. "Curvitz is number cruncher of the first order." (1983, April) 234
- Lai, Stephen. "Three easy pieces: one animator's art." (1983, April) 188
- Latham, Chris; and Erickson, John. "Micro-meltdown: A nuclear reactor simulation." (1983, April) 112
- Lengyel, David. "Half life of nuclear decay." (1983, March) 34
- Lester, Lane P. "An electronic gradebook." (1982, September) 8
- Lester, Lane P. "Illustrating lectures with graphics." (1983, January) 136
- Lester, Lane P. "Render unto IRS." (1983, February) 18
- Lester, Lane P. "Screen-to-printer color graphics." (1983, March) 18
- Lewandowski, Dennis S. "Assembly corner: A look at editor/assemblers." (1983, February) 194
- Lewandowski, Dennis S. "Assembly corner: Assembly language makes good graphics easy." (1982, October) 92
- Lewandowski, Dennis S. "Assembly corner: Be nice to your printer—give it this AL word processor." (1983, June) 76
- Lewandowski, Dennis S. "Assembly corner: Beyond the 'Vaders.'" (1983, March) 218
- Lewandowski, Dennis S. "Assembly corner: Down to business with this ML graphics game." (1982, November) 90
- Lewandowski, Dennis S. "Assembly corner: Let's blast those 'vaders.'" (1982, December) 106
- Lewandowski, Dennis S. "Assembly corner: Let's end those typing errors once and for all." (1983, January) 95
- Lewandowski, Dennis S. "Assembly corner: Let's soak up some assembly." (1982, July) 38
- Lewandowski, Dennis S. "Assembly corner: Questions-Questions and some answers for everyone." (1982, September) 73
- Lewandowski, Dennis S. "Assembly corner: Write an ML program to handle BASIC chores." (1983, April) 98
- Lewandowski, Dennis S. "Assembly corner." (1982, April) 4
- Lewandowski, Dennis S. "Assembly corner." (1982, May) 47
- Lewandowski, Dennis S. "Assembly corner." (1982, June) 6
- Lewandowski, Dennis S. "Assembly corner." (1982, August) 22
- Lishnak, Pat. "Sort numeric arrays fast with machine language." (1982, August) 9
- Macali, David. "Peripherals for the Color Computer 'joystick dilemma.'" (1983, June) 196
- Mickle, Dan. "Predicting fallout." (1983, March) 40
- Millican, Oscar. "A simple word processor." (1982, May) 6
- Mir, Jorge. "Advmaker makes adventures." (1982, August) 47
- Mir, Jorge. "Downloading from Videotex." (1981, November) 9
- Mir, Jorge. "The latest program? Here's a dating system." (1983, February) 58
- Mir, Jorge. "Let's go on a simple Rainbow adventure." (1982, July) 9
- Mir, Jorge. "Machine tape finder/saver." (1981, December) 12
- Mir, Jorge. "Make an index for your disc." (1982, February) 23
- Mir, Jorge. "Poking memory with a disc." (1982, March) 29
- Mir, Jorge. "Save ML programs to your disk." (1982, April) 42
- Mir, Jorge. "TESTEM will help you prepare for final exams." (1982, May) 17
- Mir, Jorge. "Universal data file." (1982, June) 57
- Mir, Jorge. "Videoprinter." (1981, October) 3
- Mir, Jorge. "64K conversion? Now what?" (1983, January) 166
- Montes, Martin S. "Supply water to thirsty urbanites with PIPELINE." (1983, June) 258
- Morgan, Alan J. "The famous speedup poke in fine detail." (1982, May) 32
- Morgan, Alan J. "How much memory?" (1982, January) 19
- Morgan, Alan J. "Synchronizing with your SAM chip." (1982, July) 24
- Morgan, Alan J. "Videoprinter." (1981, October) 3
- Moses, Ray. "Stars fall on 80C." (1982, June) 64
- Mosty, Mark S. "Color billbars help chart spending." (1982, April) 19
- Mummaw, Ron. "Using VARPTR, Basic's hidden command." (1983, June) 110
- Nelson, Tom. "Got a program? Get a market!" (1983, June) 164
- Nelson, Tom. "Legal discussion on the Color Computer." (1983, April) 56
- Nolan, Bill. "Continuing your character record file." (1983, February) 179
- Nolan, Bill. "Create a character file program." (1983, January) 15
- Nolan, Bill. "Create character files with this 'finished' program." (1983, March) 202
- Nolan, Bill. "Demons in the dungeon? Let's see them bite." (1982, September) 22
- Nolan, Bill. "Dragons are nice folks, too — almost all 1440 of them!" (1982, August) 62
- Nolan, Bill. "Fantasy games." (1982, July) 27
- Nolan, Bill. "Here some new FRP routines." (1982, May) 23
- Nolan, Bill. "Keeping the loathsome in line (better monster management)." (1983, April) 170
- Nolan, Bill. "Let's call JOYIN to learn ROM call technique." (1982, August) 8
- Nolan, Bill. "Make monsters from silicon — and use them here." (1982, October) 106
- Nolan, Bill. "Now a whole bag of dice." (1982, June) 38
- Nolan, Bill. "Pressed for time? Paint a dragon!" (1982, December) 50
- Nolan, Bill. "Slay your turkey with these 'duel' programs." (1982, November) 67
- Nolan, Bill. "Using DATA lines to cache your creatures." (1983, June) 124
- Nolan, Sara. "Micro-maestro—using CoCo's PLAY statement." (1982, December) 10
- O'Donnell, Timothy. "Search for words—any words." (1982, December) 130
- Odneal, Steve. "FLEX can be flexible." (1982, September) 58
- Penrose, Paul. "PLAYing around with your 80C." (1982, July) 22
- Peppenhorst, Stan. "Make authoritative decisions with this situational model." (1983, February) 132
- Pesha, Ronald. "Spelling practice." (1983, March) 198
- Plaxton, John. "Flashy program, by thunder." (1983, April) 16
- Plog, Michael. "Hard copy your diskette listings with style." (1983, March) 126
- Pollard, Ed. "Now lookit that!" (1983, January) 164
- Posner, Judd. "A small business accounting system." (1982, November) 108
- Posner, Judd. "Spectaculator statistics." (1983, February) 10
- Pouch, Arnold. "Motion picture programming — the details." (1982, April) 13
- Pouch, Arnold. "Motion picture programming—a program to run." (1982, May) 36
- Poulin, Edgar. "Offset easy." (1983, April) 172
- Preble, Lawrence D. "FLEX system is powerful addition to world of 80C." (1982, August) 32
- Preble, Lawrence D. "Stay alive at Outpost Five." (1983, February) 34
- Provost, James. "Keytones help input." (1983, April) 77
- Ray, J. D. "Spruce up your tapes with this cassette label print program." (1983, June) 30
- Ray, R. D. "Five year's worth of income tax." (1983, February) 148
- Reed, Jim. "Having an adventure with adventure." (1983, January) 20
- Reed, Jim. "Once again with adventure." (1983, February) 200
- Reeves, Mark. "An 8-bit driver for Basic use." (1982, April) 41
- Reid, Chris. "Beautiful Moire patterns." (1982, October) 74
- Reid, Chris. "CoCo Crypto—a three-star puzzler." (1983, June) 132
- Reilly, Mike. "If it's not the 'F' board, how about the '285'?" (1983, June) 160
- Ricketts, Gregory. "Dungeon adventure." (1983, January) 50
- Ridge, Herbert. "A calendar to keep track." (1982, October) 8
- Roberts, R. N. "Control your screen." (1983, March) 84
- Rosen, Bob. "Inside TDP." (1983, February) 154
- Rosen, Bob. "This will program your keys on Professional Keyboard." (1983, June) 80
- Rosen, Bob. "Title video tapes with CoCo." (1982, October) 128
- Roslund, Charles J. "Auto key repeat." (1982, September) 47
- Roslund, Charles J. "Disk directory printout." (1982, March) 31
- Roslund, Charles J. "Format your LLISTings with FLIST." (1982, December) 86
- Roslund, Charles J. "A mini-monitor for machine language use." (1982, October) 38

Roslund, Charles J. "Protect your screen from the ravages of scrolling with this machine language scroll protection utility." (1982, November) 46

Roslund, Charles J. "Speed up Basic with ML injections." (1983, January) 118

Rothermal, Bruce. "Dump to camera: Photographing your monitor." (1983, April) 88

Rumbant, C. A. "A graphic look at basic trigonometry." (1983, January) 175

Rutledge, E. P. "Disk file helps you keep track of everything." (1982, July) 30

Samm, Hubert E., Jr. "Want a workhorse editor? Here's Mr. Ed." (1983, June) 140

Scerbo, Fred. "A 3-D type game to try." (1982, November) 8

Scerbo, Fred ; Doppert, Robert ; and Haggerty, Dale. "Swamp Wars can win your croix de lilypad." (1982, June) 49

Schmidt, Jim. "Everything you wanted to know about hex." (1983, April) 178

Schmidt, Jim. "Three printer utilities." (1982, September) 51

Schrag, Roger. "Patching EDTASM to run on Disk." (1982, December) 29

Schrag, Roger. "Patching the patch: EDTASM to disk revealed." (1983, April) 194

Schroeder, Herbert. "DOS 'detach' saves wear and tear." (1983, March) 54

Searby, Sue. "Tecky yes." (1982, November) 62

Searby, Sue. "The serial/parallel syndrome: what's that?" (1983, January) 76

Searby, Sue. "What's a monitor?" (1983, March) 174

Selig, Paul. "Three disk utilities give you filing help." (1982, December) 110

Shelf, Carl. "Sub at 30 fathoms." (1983, March) 144

Sherrill, Sam. "Analysis of variance: A 'nova' for CoCo." (1983, March) 94

Sherwood, Francis. "How much will it cost to buy on time?" (1982, October) 70

Shorter, Ted. "Ice lander can be a slick run." (1982, June) 25

Snyder, Dennis. "Building a Color Computer to EPSOM MX printer interface." (1983, June) 20

Speer, Mike. "A cat's heartbeat." (1982, November) 32

Stewart, David A. "Can you deactivate the bomb?" (1983, March) 136

Steyer, David. "Non-graphic printer graphics." (1982, September) 72

Steyer, David. "Sign up and have a Banner day." (1983, January) 190

Stumpf, Peter. "A Christmas Eve fireplace." (1982, December) 34

Sullivan, Steve. "A catalog for your tape." (1983, February) 96

Sweat, David. "Get into the Hobbit of playing." (1983, January) 122

Szlucha, Thomas F. "Using the block graphics of the Okidata 82A." (1983, June) 250

Szlucha, Thomas F. "How to 'zonk proof' your disk directories." (1983, June) 84

Trevor, A. B. ; and Yahn, Charles. "X10 protocol theory: Home power control part 3." (1983, June) 98

Trevor, Alexander B. "Control your home." (1983, February) 160

Trevor, Alexander B. "Tick tock, CoCo clock." (1983, April) 20

Urban, John L. "Creating fantasy game characters with strength and wisdom." (1982, January) 6

Urban, John L. "Generating a FRP character." (1982, February) 18

Urban, John L. "Making CoCo help as an FRP referee." (1982, March) 32

Urban, John L. "Random dice methods compared and illustrated." (1982, May) 44

Urban, John L. "Random numbers make easy fun." (1981, December) 6

Waclo, John. "Here is how to pick NFL winners this season." (1982, August) 54

Waclo, John. "Pick the winners in the NFL." (1982, July) 50

Waclo, John. "80C picks the National Football League." (1982, June) 12

Walrath, Del. "Let's learn how to do a number picking game." (1982, September) 15

Weide, Dennis H. "Let CoCo keep track of your utility bills." (1983, March) 64

Weiss, Arnold. "Unidatfl revisited?" (1982, December) 114

Wells, Geoff. "And now — haunted house adventure." (1983, February) 64

Wells, Geoff. "Go adventuring with GAPAD." (1982, December) 98

Wells, Geoff. "Go adventuring with GAPAD." (1983, January) 18

Wells, Geoff. "Handy math drill." (1982, September) 82

Wells, Geoff. "A new way to make words is here." (1982, September) 95

Wells, Geoff. "Once more we'll go rowing." (1982, November) 33

White, Richard A. "Bits and bytes of Basic." (1983, January) 12

White, Richard A. "Developing a program." (1983, June) 174

White, Richard A. "Give us more vipers!" (1982, February) 26

White, Richard A. "How to form 80C user's groups." (1982, May) 27

White, Richard A. "Let's look at keyboard input." (1983, March) 192

White, Richard A. "Making Spectaculator strut its stuff." (1982, June) 31

White, Richard A. "Print it bigger than you can." (1983, June) 198

White, Richard A. "Well-defined variables produce clarity, conservation." (1983, February) 88

Wick, Gary. "Who wrote *the Rainbow's* first trivia game?" (1983, June) 16

Wilson, M. P. "An index to *The Rainbow*?" (1983, January) 126

Witham, Burton B., Jr. "CoCo knows all the callsigns." (1983, February) 110

Witham, Burton B., Jr. "Keep a Ham radio log." (1982, December) 124

Witham, Burton B., Jr. "A rapid logger for Hams." (1983, March) 180

Witham, Burton B., Jr. "A super duper for Hams." (1983, January) 80

Ziniewicz, George. "Graphics? Here are two...by George!" (1982, November) 86

*Leslie A. Foster is a Research Associate with the Dalhousie Ocean Studies Programme of Dalhousie University, Halifax, Nova Scotia, Canada. He is the co-editor of Marine Affairs Bibliography: A Comprehensive Index to Marine Law and Policy Literature. The software which made The Rainbow Index was originally developed for the Marine Affairs Bibliography.*

## the RAINBOW's

# SIMULATION CONTEST

Write a simulation program in the *Rainbow's* Simulation Contest. You will have the chance to win valuable prizes and to share your simulation with thousands of Color Computer, TDP-100 and Dragon-32 owners worldwide.

Your simulation can be about any subject—and can be either graphic or non-graphic. See examples of simulation programs printed in the *Rainbow*.

A few of the prizes already offered . . .

**A New Epson FX-80 Printer, 4K Buffer and Cables (Value \$870)**  
**A Disk Drive And Controller (Value \$470)**

**JARB Software**  
**The Rainbow**

Hardware Worth \$150  
 Software Worth \$75  
 Software Worth \$75  
 Any Program  
 Copy of "Speak Up"  
 "The Stereo Composer" Worth \$119  
 ANTECO'S COLOR TEXTSET 1 Worth \$34.95

Spectrum Projects  
 Tom Mix Software  
 Computer Island  
 Custom Software Engineering  
 Classical Computing Inc.  
 Speech Systems  
 Chattanooga Choo Choo Software

**RULES:** All programs must be original works, no "conversions." Entries must be postmarked by July 30 and become the property of Falsoft, Inc. publisher of *the Rainbow*. Decision of the judges is final. Duplicate prizes will be awarded in the case of ties. Winning programs to be featured in a special *Rainbow* Simulation issue. Mark entries "Simulation Contest Editor" and send to *the Rainbow*, P.O. Box 209, Prospect, KY 40059.



## Small Sourcebook Should Be Big Hit For Programmers

Have you ever bought a TRS-80 sourcebook and found you had to sort through hundreds of listings just to find one that worked on your computer? I know I have, and it always frustrated me severely. That is, before the *TRS-80 Programmer's Sourcebook* became available.

The *TRS-80 Programmer's Sourcebook* is a publication containing listings of programs of all TRS-80 computers. This 70-plus-page first edition also contains a listing of reference publications, periodicals, books, advertisements, and a listing of clubs which welcome TRS-80 users. The book comes in an 8½" x 11" paperback format.

The thing which makes the *TRS-80 Programmer's Sourcebook* so easy to use is the way the listings are arranged. Unlike Radio Shack's sourcebook, the *TRS-80 Programmer's Sourcebook* organizes the listings by computer model. The *TRS-80 Programmer's Sourcebook* also lists not only application software, but system software as well.

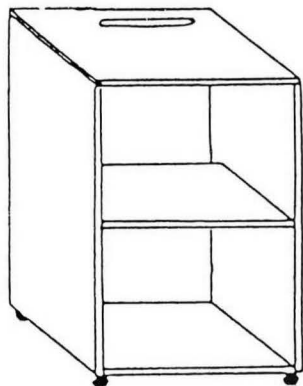
The application software is further divided into the following categories: Business/Accounting, Business/Inventory Control, Education-Classroom, Education-Home, Games, Home/Personal Use, Specific Industry/Profession, and Statistics/Math. The system software, program listings Radio Shack seems to refuse to print, are divided into the following categories: Data Management Services, Debugging Tools, Editors, I/O Services, Languages, Operating Systems, Routines, and Utilities. The author stated a new section, Assemblers/Dissassemblers, will be added in future issues.

This new publication will be offered bi-yearly in January and July. The first issue, published in January 1983, is only 80 pages long. However, the author is soliciting people to send in program publication forms of their programs. The author is also looking for companies to advertise in his publication. If people and companies contribute to the book, *TRS-80 Programmer's Sourcebook* will become a big hit. I found this issue to be slightly small, but I'm sure future issues will become bigger and even better.

(Ocean, Inc., P.O. Box 2331, Springfield, VA 22152, \$4.95)

—Dave Mercer

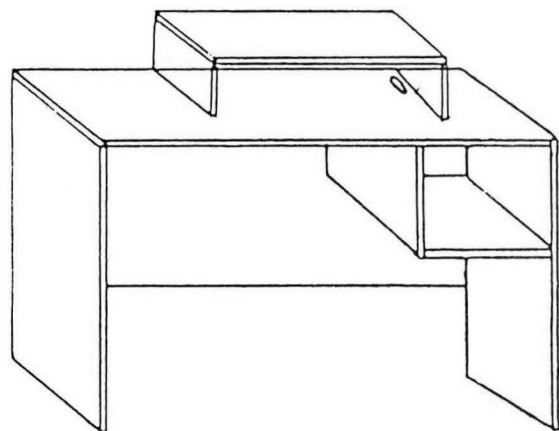
NEW \* NEW \* NEW \* NEW \* NEW \* NEW \* NEW \* NEW \* NEW \* NEW \* NEW \* NEW



Model ORS-1  
\$ 129.95

These stands are available in one Color only:  
American Walnut

The stands can be covered with formica tops and sides for an extra \$ 50 (ORS-3 \$75) and the Formica colors are: Walnut and Knot.



Model ORS-2.....\$ 129.95

Dealer Inquiries Welcome

School & Club Discounts

Dimensions:

All stands are 27" High

ORS-1 is 24" Wide  
by 24" Deep

ORS-2 is 29" Wide  
by 18" Deep

YOU always wanted something to show you were a color computer owner well here it is:

A LITTLE COLOR COMPUTER LABEL HN for only \$5.95 (pewter)

Send your order to :

All computer stands are  
Shipped Freight collect  
TX. Residents add 5% sales tax



PcLEAR4co.

P. O. BOX 294

HENDERSON, TEXAS 75653-0294

Distributors of Quality Color Computer Equipment



# RAINBOW Info

## How To Read Rainbow

Please note that all the BASIC program listings you will find in *the Rainbow* are formatted for a 32-character screen — so they will show up just as they do on your CoCo screen. One easy way to check on the accuracy of your typing is to compare what character "goes under" what. If the characters match — and your line endings come out the same — you have a pretty good way of knowing that your typing is accurate.

We also have "key boxes" to show you the *minimum* system a program needs. But, *do* read the text before you start typing.

Finally, the little cassette symbol on listings indicates that program is available through our *Rainbow On Tape* service. An order form for this service is on the insert card bound in the magazine.



## The Rainbow Seal

The Rainbow Certification Seal is our way of helping you, the consumer. The purpose of the Seal is to certify to you that any product which carries the Seal has been physically seen by us and that it does, indeed, exist.

Manufacturers of products — hardware, software and firmware — are encouraged by us to submit their products to *the Rainbow* for certification. We ascertain that their products are, in actuality, what they purport to be and, upon such determination, award a Seal. This lets you know that we have seen the product and that it does, indeed, exist.

The Seal, however, is not a "guarantee of satisfaction." The certification process is different from the review process. You are encouraged to read our reviews to determine whether the product is right for your needs.

There is absolutely no relationship between advertising in *the Rainbow* and the certification process. Certification is open and available to any product pertaining to CoCo. A Seal will be awarded to *any* commercial product, regardless of whether the firm advertises or not.

We will appreciate knowing of instances of violation of Seal use.

## Using Machine Language

Machine Language programs are one of the features of *the Rainbow*. There are a number of ways to "get" these programs into memory so that you can operate them.

The easiest way is by using an Editor-Assembler, a program you can purchase from a number of sources.

An editor-assembler allows you to enter mnemonics into your CoCo and then have the editor-assembler assemble them into specific instructions that are understood by the 6809 chip that controls your computer.

When you use an editor-assembler, all you have to do, essentially, is copy the relevant instructions from *the Rainbow's* listing into CoCo.

Another method of getting an assembly language listing into CoCo is called "hand assembly." As the name implies, you do the assembly by hand. This can *sometimes* cause problems when you have to set up an ORIGIN statement or an EQUATE. In short, you have to know something about assembly to hand assemble some programs.

Use the following program if you wish to hand assemble machine language listings:

```
10 CLEAR200,&H3F00:I=&H3F80
20 PRINT "ADDRESS:";HEX$(I);
30 INPUT "BYTE";B$
40 POKE I,VAL("&H"+B$)
50 I=I+1:GOTO 20
```

This program assumes you have a 16K CoCo. If you have 32K, change the &H3F00 in Line 10 to &H7F00.

## What's A CoCo

CoCo is an affectionate name which was first given to the TRS-80 Color Computer by its many fans, users and owners. As such, it is almost a generic term for three computers, all of which are very much alike.

When we use the term CoCo, we refer to the TRS-80 Color Computer, the TDP System-100 Computer and the Dragon-32 Computer. It is easier than using the three "given" names throughout *the Rainbow*.

In most cases, when a specific computer is mentioned, the application is for that specific computer. However, since the TDP System-100 and TRS-80 Color are, for all purposes, the same computer in a different case, these terms are almost always interchangeable.

## The Rainbow Check

The small boxes which you see with programs in *the Rainbow* are our *RAINBOW CHECK* program, which is designed to help you type in programs accurately.

The check program itself is a machine language program which will count the number of characters you type in. You can then compare the number the *RAINBOW CHECK* gives you to those printed in *the Rainbow*. On longer programs, some benchmark lines are given. When you reach the end of one of those lines with your typing, simply check to see if the numbers match.

To use the *RAINBOW CHECK*, type in *CLEAR 25, 16303* (or *CLEAR 25, 32687 for 32K*) and *CSAVE* the program that follows. Then type in the command *EXEC* and press *ENTER*.

Now, whenever you press the down arrow, CoCo will give you the hexadecimal number of bytes in memory. This is to check against the numbers printed in *the Rainbow*. If your number is different, check the listing carefully to be sure you typed in the proper BASIC program code.

Type in programs *exactly* as you see them printed in *the Rainbow*. All BASIC listings are printed out 32 characters wide, conforming exactly to the CoCo screen display. Because the *RAINBOW CHECK* counts spaces, too, you should follow the spacing just as it appears in the magazine.

Here's the program:

```
10 CLS:IF PEEK(116)=127 THEN
X=32688 ELSE X=16304
20 CLEAR 25,X-1
30 IF PEEK(116)=127 THEN X=32688
ELSE X=16304
40 FOR Z=X TO X+77
50 READ Y:W=W+Y:PRINT Z,Y;W
60 POKE Z,Y:NEXT
70 IF W=5718 THEN 80 ELSE PRINT
"DATA ERROR":STOP
80 EXEC X:END
90 DATA 182, 1, 106, 167, 141, 0, 68
100 DATA 134, 126, 183, 1, 106, 190
110 DATA 1, 107, 175, 141, 0, 57, 48
120 DATA 141, 0, 4, 191, 1, 107, 57
130 DATA 129, 10, 38, 44, 52, 22, 220
140 DATA 27, 147, 25, 142, 4, 0, 141
150 DATA 6, 31, 152, 141, 2, 32, 25
160 DATA 52, 2, 68, 68, 68, 68
170 DATA 141, 4, 53, 2, 132
180 DATA 15, 129, 9, 46, 4, 139, 112
190 DATA 32, 2, 139, 55, 167, 128, 57
200 52, 22, 126, 0, 0
```



**NEW** for the Color Computer TRS-80

## 'COCOCASSETTE' SUBSCRIPTION SOFTWARE

\*TRS-80 IS A TRADEMARK OF TANDY COMPANY



ENJOY A MONTHLY COLLECTION OF 8-10 PROGRAMS!  
Including games, education, home finance and more;  
on cassette for as low as **\$5.00** a month! Add some ac-  
tion and imagination to your Color Computer. . . Best of  
all, we do the work!

### LOOK AT SOME OF THE LETTERS WE RECEIVED FROM OUR SUBSCRIBERS.

"I just thought I'd let you know that your cassettes arrive in good order, load just fine, and I really enjoy your programs!"

MARION, OHIO

"I was extremely impressed by the first tape I received from you. The added extras are just super."

WILLOW GROVE, PENNSYLVANIA

"Seldom do I ever write a fan letter. Usually if something is good, nothing is ever said. I just renew the subscription or buy the product instead. T&D is an exception. I subscribe to several cassette computer magazines. Yours is certainly the most creative. The covers are original and clever. The material covered is excellent!"

PINE BLUFF, ARKANSAS

"I only entered a six-month trial but am already willing to extend my subscription!"

COLETSWAH, TENNESSEE

### PRICES

|                      |         |
|----------------------|---------|
| 1 YR (12 ISSUES) . . | \$55.00 |
| 6 MO (6 ISSUES) . .  | \$30.00 |
| SINGLE COPIES . .    | \$ 6.00 |

—MICHIGAN RESIDENTS: ADD 4% TO ORDER

—OVERSEAS: ADD \$10.00 TO SUBSCRIPTION AND \$1.00 TO SINGLE COPIES

**616 396-7577**

PROGRAMS ARE FOR  
EXTENDED BASIC  
MODEL ONLY. ISSUES  
ARE SENT FIRST CLASS.



SUBSCRIPTION SOFTWARE



IMMEDIATE SHIPMENT!  
PERSONAL CHECKS WELCOMED!  
SEND CHECK OR MONEY ORDER TO:



**T & D SOFTWARE P.O. BOX 256-C • HOLLAND, MICH 49423**

## A Break At McCoCo's & Dollars And Sense

Exceptionally good educational programs for young children are to be treasured, especially when the learning experience is enhanced by strong graphics, good sound and playtime qualities. That's exactly what you get in *Moneypak*—not once, but twice, as this delightful package contains two gems.

You know you have something special as soon as you open the package because the creators have supplied \$6.71 in play money, bringing squeals of delight from young son. And you can't wait to load *McCoCo's Menu* and *Dollars and Sense*, as the contagious spirit rubs off on you.

First, it's a trip to McCoCo's. . .

Better grab a bite to eat before you get involved with *McCoCo's Menu* because, if my experience is any indicator, about halfway through you will experience a dryness of the mouth, severe hunger pains and a growling stomach. If you've ever had a "Big Mac Attack," you know the sensation and there's only one cure.

A golden arch, cleverly contained in the rainbow over the neat little restaurant, and the familiar tune of "You, You're

The One. . ." welcome you to what is obviously a fast-food establishment. After introducing yourself via the keyboard to this 16K-ECB-required program you are referred to by your first name when you place a new order.

The menu consists of burgers, hot dogs (?), malteds, coffee, pie, French fries, shake, and salad—all of those vitamin-rich essentials that are so good for you. The game's creator (probably on a diet himself) has been wise enough to protect you from "pigging out" by seeing to it that you are allowed only two items when the menu is presented. Plus, *McCoCo* even selects the items.

Nevertheless, *McCoCo's Menu* is a great vehicle for enticing the youngsters into learning basic arithmetic. The game offers in quick fashion 10 different menus, with the prices of the different selections chosen at random. The "customer" is expected to add the two items and enter the correct amount, receiving a brief serenade when adding in the right amount and a low buzz when entering the wrong answer. *McCoCo* supplies the right answer if the total is incorrect.

The game also is a good tool for teaching youngsters the use of the decimal in monetary totals, responding with an incorrect signal when the point is entered in the wrong place.

Another benefit, I was surprised to learn, was that the game also is useful to youngsters who own hand-held calculators. In yesteryears that would have been a no-no, but according to one of my seven-year-old son's future teachers, he should have an opportunity to practice using them. Can you believe they're using them in the third grade? I guess it's not too surprising, because I've learned that CoCo is being

# The Color Computer Word Processor!

**MASTER WRITER** (we changed our name from WORDMASTER) is a professional quality full screen oriented word processor for your color computer. Take a look at what you get.

**MASTER WRITER'S FULL SCREEN-ORIENTED EDITOR** allows you to move the cursor anywhere in your text using the up, down, right and left arrows. Do this one character at a time or by line or page. Insert, delete or replace text at the cursor watching your changes as you make them. Delete or move blocks of text from one place to another. Merge in text from other files.

**AUTOMATIC CARRIAGE RETURN** after last complete word on each line; with this and **AUTOMATIC PAGE FEED** you don't have to worry about where a line or page ends — just type!

**MASTER WRITER** runs on a 16K, 32K, or 64K color computer, taking advantage of all available memory. Use it with **DISK OR CASSETTE** based systems. **EXTENDED BASIC IS NOT REQUIRED** for cassette version.

**EASY TO UNDERSTAND MANUAL** has you comfortably using **MASTER WRITER** in minutes. It is a **USER-FRIENDLY MENU-DRIVEN SYSTEM** with single letter commands. Check any command without having to refer to the manual with the **HELP SCREEN**.

**10 PROGRAMMABLE FUNCTION KEYS** allow easy insertion of frequently used words or phrases.

**WORKS WITH ANY PRINTER.** Take full advantage of your printer's special functions such as variable character size and emphasized characters with **EASY EMBEDDING OF PRINTER CONTROL CODES**.

**GLOBAL SEARCH** function lets you quickly locate specific strings for replacement or deletion.

Customize form letters or standard text with the **EMBEDDED PAUSE** feature. Just "fill in the blanks" when your printer pauses for a personalized appearance.

**LIMITED MULTI-TASKING** feature lets you print one file while editing another.

In addition to regular text you can use **MASTER WRITER** to **CREATE BASIC PROGRAMS** with the convenience of full-screen editing. It can also be used to make and edit simple **MAILING LISTS**.

**OTHER FEATURES** include easy setting of left, right, top and bottom margin, printer line width, and lines per page. Also repeat keys, auto line centering, auto page numbering and choice of display color formats.

**TO ORDER** send \$29.95 for cassette version or \$34.95 for disk version plus \$2.50 shipping (Calif. residents add sales tax) to: **PYRAMID DISTRIBUTORS, 527 HILL ST., SANTA MONICA, CA 90405 (213) 399-2222.**

**MASTER WRITER** \$29.95 Cassette  
\$34.95 Disk



# 80-U.S.

THE TRS-80 USERS JOURNAL

If you own a TRS-80® Model I, Model II, Model III, the Color Computer, or the new Pocket Computer, YOU NEED 80-U.S.!

## The 80-U.S. Journal has

programs for your enjoyment and enlightenment. Every issue contains several Basic or machine language program listings. It contains Business articles and program listings. No matter where you are, there is something for YOU in the Journal!

*and...*

The Journal contains reviews of hardware and software. Our "Evaluation Reports" will help you make the best choice in selecting additions to your system.

## Save Over 50%

You can save over 50% off the cover price of *80-U.S. Journal*. For the remarkably low price of *only* \$16.00, a savings of \$20.00 (cover price), you will receive a wealth of useful information every month. As a special **BONUS**, if you enclose payment with your order, you will receive an extra issue for each year of your subscription order. *Order three years of 80-U.S. and receive three extra issues! At no cost to you!*

Is your  
TRS-80  
Lonely?

Write today for  
our

"No Risk Offer"

SEND TO:

80-U.S. Journal  
3838 South Warner Street  
Tacoma, Washington 98409  
Phone (206) 475-2219

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Visa/MC \_\_\_\_\_

Exp. Date \_\_\_\_\_

1 yr. \$16     2 yrs. \$31     3 yrs. \$45

Please allow 6 to 8 weeks for your first issue.

TRS-80 is a Registered Trademark of the Tandy Corp.

# compu•sette®

## TAPES & DISKS

100% ERROR-FREE  
FULLY GUARANTEED



Compu•sette, a product of MICRO-80 INC

### The Micro-Trac™ Generation

Used by Software Firms & Computer Hobbyists  
Choice of School Districts Nationwide

| CASSETTES          | MINI<br>12-PAK | STANDARD<br>24-PAK |
|--------------------|----------------|--------------------|
| C-05 .....         | \$ .79         | \$ .59             |
| C-10 .....         | \$ .89         | \$ .69             |
| C-20 .....         | \$ .99         | \$ .89             |
| C-30 .....         | \$1.29         | \$1.09             |
| Custom Cases ..... | \$ .26         | \$ .21             |

Cases recommended to protect sensitive cassettes.

| 5 1/4" DISKETTES                                 | MINI<br>5-PAK | STANDARD<br>10-PAK* |
|--------------------------------------------------|---------------|---------------------|
| Soft Sector<br>Single Sided<br>S/D Density ..... | \$14.95       | \$26.95             |

\*10 PAK w/custom library case, add \$3.00

— UPS SHIPPING —  
(No. P.O. Boxes please)

\$3.00 per pack

— Canadian shipping multiply by 2 —

**No. 1 Magnetic Media in the USA!**

— Write for volume prices —

TOLL-FREE  
(orders only)

1-800-528-6050  
ext. 3005

In Arizona State  
1-800-352-0458  
ext. 3005



# MICRO-80™ INC.

E. 2665 Busby Road  
Oak Harbor, WA 98277  
1 (206) 675-6143

used at the kindergarten level in some schools. Anyway, my young son will also practice his math on *McCoCo's Menu* using the old-fashioned method, with pencil in hand.

At any rate, 10 points are awarded for each correct answer (or vice-versa). Scoring nine correct answers out of 10 questions, for example, gives you a 90 percent score. If you grade yourself on the Bell curve, give yourself an "A". *McCoCo* offers encouragement along the way if you don't do so well ("Better luck next time" or "You need more practice"), and gives you praise if you do well ("Great game!").

After the colorful opening to the game, I was a bit disappointed when, finally getting all the answers right, I wasn't rewarded with the rest of the opening tune or something! After forgetting about the decimal point placement several times and committing several careless errors, I felt I had earned more than a written note.

For a children's learning game, a lot of extra work has obviously gone into the program. It's easy to *CLOAD* and fun to play, making the learning experience a pleasant one.

*Dollars and Sense*, the other program in the package, is probably just as good, although it lacks the logical appeal of the fast-food restaurant atmosphere.

There are three levels of skill, which makes it nice if you have children in different grades, and ensures a continued interest in the program if you have only one child. The first level is up to 50 cents, the second \$1, the third \$2.99.

Familiar objects—checkers, crayons, soda pop, toy car, a Basic Man comic book, pumpkin, toy plane, ice cream—that evoke happy memories keep the child wondering what's next. Some nice things happen to the objects, too. The soda pop, complete with straw, suddenly evaporates. The ice cream disappears, gulp by delicious gulp. A puppet changes its shape, etc. A great touch, actually, and almost as appealing to the kids as the Saturday morning cartoons.

The challenge for the youngster is to type the number of coins needed to make up the price of the object. The symbols are: "\$" for dollar, "H" for half dollar, "Q" for quarter, "D" for dime, "N" for nickel, and "P" for penny. The child is required to type in the correct amount of money to make a purchase. The program is flexible in that there are several different combinations of coins that can be used, just as in real life.

If the puppet, for example, costs \$1.25, the children can type in a dollar and a quarter, a dollar, two dimes and a nickel; even 125 pennies—the possibilities are as many as there are in real life.

After the child has entered what he or she thinks is the correct amount, the total is entered. If the amount is correct, the next item is presented. If wrong, a way is shown to get the right answer. There are 10 items in a series and, upon completion, the child receives a report card and, if he or she has done a good job, some congratulatory remarks.

Computer Island has done its homework and the results show in both ends of this program. An A+ is awarded to those folks for excellent work. We look forward to more such programs.

(Computer Island, 227 Hampton Green, Staten Island, NY 10312, \$22.95 tape)

— Charles Springer





# Nanos Systems Corp. REFERENCE CARDS For Models I, II, III, Color, Pocket and Apple II & II Plus



"Herbome Images"

\* TRS-80 is a Registered Trademark of Tandy Corp.  
Computer picture reprinted permission Tandy Corp.

APPLE is a registered trademark of Apple Computing, Inc.



Each card is a complete summary of the reference manuals and the microcomputer. Cards are two or more colors, printed on 80 pound Beckett Antique cover stock or a comparable stock, stretch-wrapped in plastic for shipping. They are accordion-foldup cards, in the same style as the traditional IBM reference cards used on the major computers for years. Fold-up size is eight and one-half by three and three-quarter inches, so they will fit easily into the shirt pocket. These cards provide a complete summary of the manuals plus many extras at your fingertips.

| MODEL I                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | MODEL II                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | MODEL III                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | COLOR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | APPLE II & II PLUS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>BASIC: Buff &amp; Blue</b><br>5 Panels, 10 Pages<br>(For the Classroom)<br>Memory Map.<br>Easy Graphics.<br>Basic Statements.<br>Basic Functions.<br>Basic Facts.<br>Special Characters.<br>Basic Commands.<br>Edit Subcommands.<br>PRINT USING Examples.<br>Message & Codes.<br>Reserved Words.<br>Special Keys.<br>Ascii Character Chart,<br>with Space Compression Codes.<br>Control Codes.<br>Basic Internal Codes.<br>Hex/Dec Conversion Chart.<br>Screen Line Layout.<br><b>BASIC &amp; ASSEMBLER: Buff</b><br><b>8 Panels, 16 Pages</b><br>(For the Pro)<br>Complete Z80 Instructions.<br>Assembler Instructions,<br>Commands, Operators,<br>Editor/Assembler Commands,<br>and Edit Subcommands.<br>Flags, Conditions, & Chart.<br>Internal Routines.<br>Assembler Error Msgs.<br>Plus Most Items in the Basic Card | <b>BASIC &amp; ASSEMBLER: Green</b><br>10 Panels, 20 Pages<br>(For the Business)<br>Small Memory Map.<br>Screen Layout.<br>Easy Graphics.<br>Complete Z80 Instructions.<br>Series-1 Assembler Instr.<br>Commands, Operators, and Edit<br>Subcommands.<br>Assembler Error Msgs.<br>Power-up Error Msgs.<br>Flags, Conditions, & Chart.<br>Wild Cards, DOS Messages.<br>SVC Procedure Panel.<br>Host Logon Panel.<br>Version 2.0 Lib Command Formats<br>and System Utility Formats.<br>Basic Functions & Statements.<br>DOS File Naming Convention.<br>Basic Commands & Edit<br>Subcommands.<br>Special Keys.<br>Basic Internal Codes and<br>Reserved Words.<br>Basic Msgs. & Codes.<br>PRINT USING Examples.<br>Special Characters.<br>"DO" Utilities & BASIC Command.<br>Ascii Character Chart with SVC<br>Names and Numbers.<br>Control Codes. | <b>BASIC: Blue &amp; Buff</b><br>6 Panels, 12 Pages<br>(For the Classroom)<br>Special Characters.<br>Kana Characters.<br>Euro-Characters.<br>Memory Map.<br>Special Keyboard Functions.<br>Ascii Char. Chart w/Space<br>Compression Codes.<br>Control Codes.<br>Cassette Loading Err Msgs.<br>Basic Commands, Edit<br>Subcommands, Special Chars.,<br>Basic Statements, Facts,<br>Functions, Derived Functions,<br>Special Operations (POKES),<br>PRINT USING Examples.<br>Basic Msgs. & Codes.<br>Basic Internal Codes.<br>Reserved Words.<br>Screen Line Layout.<br><b>BASIC &amp; ASSEMBLER: Blue</b><br><b>10 Panels, 20 Pages</b><br>(For the Pro)<br>Complete Z80 Instructions.<br>Assembler Instructions, Commands,<br>Operators.<br>Series I Editor/Assembler<br>Commands & Edit Subcommands.<br>Flags, Conditions, & Chart.<br>Hex/Dec Conversion Chart.<br>Assembler Error Msgs.<br>Internal CALL Routines.<br>Break Processing Procedure.<br>Plus all items in the Basic card. | <b>BASIC &amp; EXTENDED:</b><br>Grey + 9 Colors.<br>8 Panels 16 pages<br>(For the Artist)<br><b>All Color Graphics.</b><br>System Commands.<br>PRINT USING Examples.<br>Special Characters.<br>Special Keys.<br>Cassette Loading Err Msgs.<br>Basic Functions & Statements.<br>Playing Music, Making a Circle,<br>and Drawing Panels.<br>Derived Functions.<br>Messages & Codes.<br>Musical Notes, by Octave, in<br>Color, Including Rests and Time.<br>Memory Map.<br>Reserved Words.<br>Internal Codes.<br>A Page of Tips.<br>Ascii Char. Codes Chart.<br>Including Inverse Graphics<br>and Color Graphics.<br>Control Codes.<br>Color Group Chart.<br>Pmode Information Summary.<br>Screen Line Layout.<br>Extended Graphics Pmode<br>Illustrations. | <b>BASIC: Red &amp; Pink</b><br>7 Panels, 14 Pages<br>(For the Classroom)<br>48K Memory Map<br>APPLESOFT and INTEGER BASIC.<br>Basic Statements.<br>Basic Functions.<br>Derived Functions.<br>Special Characters & Operators.<br>System & Utility Commands.<br>Pokes, Peeks, Calls.<br>Monitor Commands.<br>Key & Control Functions.<br>APPLESOFT Internal Codes.<br>APPLESOFT Reserved Words.<br>Integer Basic Addressing.<br>DOS 3.3 Command Summary.<br>Color Selection Chart.<br>Error Msgs. & Handling.<br>Reading Machine Language.<br>Hex/Dec Conversion Chart<br>ASCII, Print, Video, 6502, Integer<br>and APPLESOFT Code Reference<br>Chart, 0-255.<br><b>Basic &amp; 6502: Red</b><br><b>8 Panels, 16 Pages</b><br>(For the Pro)<br>All features of the Basic Card, Plus:<br>6502 Timing.<br>6502 Language Simplified.<br>Flags & Conditions with Reference<br>Chart. |

| POCKET                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Please send me: | Card                                           | Price  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|------------------------------------------------|--------|
| <b>BASIC: Purple</b><br>5 Panels, 10 Pages<br>Operating Characteristics<br>Memory Types and Limitations.<br>Modes of Operation.<br>PRO Mode.<br>RUN Mode.<br>RESERVE Mode.<br>DEF Mode.<br>Fixed Variable Facts and<br>References.<br>System Function Keys.<br>Math and Logic Function Keys.<br>Normal Character Keys.<br>Special Characters and<br>Function Keys.<br>Basic Commands.<br>Cassette Interface Commands.<br>Reserved Words.<br>Math and Numeric<br>Derived Functions.<br>Basic Statements.<br>Error Messages and Codes.<br>USING Statement Examples<br>and more...! | ( )             | Copies of MODEL I BASIC & ASSEMBLER            | \$4.95 |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | ( )             | Copies of MODEL I BASIC-ONLY                   | 2.95   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | ( )             | Copies of MODEL II BASIC & ASSEMBLER           | 5.95   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | ( )             | Copies of MODEL II SVC                         | 2.95   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | ( )             | Copies of MODEL II COMMANDS & UTILITIES        | 3.95   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | ( )             | Copies of MODEL III BASIC & ASSEMBLER          | 5.95   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | ( )             | Copies of MODEL III BASIC-ONLY                 | 3.95   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | ( )             | Copies of COLOR BASIC AND EXTENDED             | 4.95   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | ( )             | Copies of POCKET BASIC                         | 2.95   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | ( )             | Copies of APPLE II & II PLUS BASIC             | 3.95   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | ( )             | Copies of APPLE II & II PLUS BASIC & 6502      | 4.95   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | ( )             | Copies of Z80                                  | 4.95   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | ( )             | Copies of ZX80, 81, & TIMEX SINCLAIR-1000      | 5.95   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | ( )             | Copies of HEATH/ZENITH HDOS for H8/H89/Z89/Z90 | 5.95   |

Ask for them at your store or bookstore or order from us.

Wholesale prices available in quantities over 24.

Send Check or Money Order to:  
 NANOS SYSTEMS CORP.  
 P.O. BOX 24344  
 SPEEDWAY, IN 46224  
 (317) 244-4078

NAME: \_\_\_\_\_  
 ADDRESS \_\_\_\_\_  
 CITY \_\_\_\_\_ STATE \_\_\_\_\_ ZIP \_\_\_\_\_  
 Indiana Residents Add 5 Percent for Indiana Sales Tax

A pocket card for your pocket computer.









# ADVERTISER'S INDEX

We encourage you to patronize our advertisers—all of whom support the TRS-80 Color and TDP System-100 computers. We will appreciate your mentioning the RAINBOW when you contact these firms.

|                                          |                          |                                            |               |                                      |                                   |
|------------------------------------------|--------------------------|--------------------------------------------|---------------|--------------------------------------|-----------------------------------|
| Aardvark 80 .....                        | 217                      | Desert Press, Inc .....                    | 86            | Nelson Software Systems .....        | 10, 11, 136, 137                  |
| Abacus Computers .....                   | 14                       | Desert Software .....                      | 12            | New Salem Research .....             | 235                               |
| Adventure International .....            | 19                       | Doctor Preble's Programs .....             | 211           | Northwest Data .....                 | 94                                |
| All American Ultra-Light Industry .....  | 228                      | Double Density Software .....              | 145           | Oelrich Publications .....           | 150                               |
| All Color Software .....                 | 166                      | DSL Computer Products .....                | 247           | Oregon Color Computer .....          | 96                                |
| All Systems Go .....                     | 251                      | Dugger's Growing Systems .....             | 61            | Owl's Nest Software .....            | 120                               |
| AMDEK Corp. ....                         | 41                       | Dymax .....                                | 190           | Owl-Ware .....                       | 268                               |
| A. M. Hearn Software .....               | 170                      | Dynamic Electronics .....                  | 108           | Parsons Software .....               | 68                                |
| American Library & Info Services .....   | 58                       | Eaton Computer Products .....              | 32            | PBJ, Inc. ....                       | 15                                |
| Anteco .....                             | 171                      | 80-U.S. Journal .....                      | 301           | PClear4 Co. ....                     | 297                               |
| Arizin .....                             | 185                      | Elite Software .....                       | 52, 87        | PCLEAR 80 .....                      | 180                               |
| Arizona Discount Software .....          | 222                      | Emerald Computer Service .....             | 38            | Peacock Enterprises .....            | 148                               |
| Ark Royal Games .....                    | 77                       | Endicott Software .....                    | 63            | Petrocci Freelance Associates .....  | 69                                |
| Armadillo International .....            | 249                      | Erickson, B. ....                          | 88            | B.T. Pearce .....                    | 231                               |
| Aurora Software .....                    | 286                      | EVS .....                                  | 101           | Platinum Software .....              | 129                               |
| B&B Software .....                       | 34                       | Federal Hill Software .....                | 221           | Prickly-Pear Software ..             | 70, 135, 151, 269                 |
| B.C. Engineering .....                   | 82                       | Follett Educational Systems .....          | 131           | Prism Software .....                 | 55                                |
| Basic Programs .....                     | 197                      | Freeland Engineering .....                 | 172           | The Program Store .....              | 277                               |
| Basic Technology .....                   | 79                       | Gem Mount Mfg. ....                        | 94            | The Programmer's Guild .....         | 207                               |
| Bear Bones Software .....                | 35, 119                  | Genesis Software .....                     | 143           | The Programmer's Institute .....     | 95                                |
| Bertamax .....                           | 65                       | GIMIX .....                                | 31            | PXE Computing .....                  | 67                                |
| Better Software .....                    | 12                       | Greentree Software .....                   | 210           | Pyramid Distributors .....           | 156, 300                          |
| B5 Software .....                        | 214                      | Harmonycs .....                            | 142           | Q-Soft .....                         | 84                                |
| Botek Instruments .....                  | 23                       | Hawg Wild .....                            | 104           | Quasar Animations .....              | 125, 304                          |
| Bruck Associates .....                   | 78                       | Hawkes Research Services .....             | 240           | Radio Shack .....                    | 57                                |
| Bumblebee Software .....                 | 287                      | HIB Software .....                         | 284           | Rainbow Connection Software .....    | 283                               |
| Calc-Soft .....                          | 186                      | Frank Hogg Laboratory .....                | 45, 46, 47    | Rainbow On Tape .....                | 167                               |
| Cer-Comp .....                           | 199                      | Home Base Systems .....                    | 109           | Rainbow Poster .....                 | 274                               |
| Chattanooga Choo-Choo<br>Software .....  | 188                      | Howard Medical .....                       | 39, 73        | Real Software .....                  | 16                                |
| Chris Computers .....                    | 80                       | HYCOMP Software .....                      | 220           | Reitz Electronics .....              | 37                                |
| Chroma Systems .....                     | 229                      | Hyperion .....                             | 54            | REM Industries .....                 | 200                               |
| Chromasette .....                        | 51                       | Illustrated Memory Banks .....             | 175           | S & S Arcade .....                   | 267                               |
| Circle City Software .....               | 127                      | Intellectronics .....                      | 149           | SDS Computers .....                  | 64                                |
| Classical Computing .....                | 250, 288                 | Inter-Action .....                         | 111, 279      | SP Software .....                    | 198                               |
| CoCo Data Enterprises .....              | 216                      | Intercept Enterprises .....                | 144           | Selected Software .....              | 103                               |
| CoCo Hut .....                           | 71                       | International Color Computer<br>Club ..... | 193           | Shamrock Software .....              | 74                                |
| CoConut Products .....                   | 201                      | International Software .....               | 179           | Shauntronics .....                   | 239                               |
| CoCo Pro .....                           | 24                       | Intracolor .....                           | 141           | Snake Mountain Software .....        | 85                                |
| CoCo Warehouse .....                     | 203                      | JARB Software .....                        | 191, 243      | 68 Micro Journal .....               | 72                                |
| Cognitec .....                           | 89                       | J&M .....                                  | 195           | Soft City .....                      | 97, 153                           |
| Color Computer News .....                | 173                      | J-NOR Industries .....                     | 237           | Soft Sector Marketing .....          | 181                               |
| Color Computer Weekly .....              | 280                      | JPC .....                                  | 176           | Software Connection .....            | 114                               |
| Color Software Services .....            | 9, 25, 274               | JPS .....                                  | 270           | Software Factory .....               | 266                               |
| Color Soft Software .....                | 230                      | Kaleidoscopic Creations .....              | 242           | Software Shop .....                  | 183                               |
| Colorware .....                          | 26, 27                   | Kalglo Electronics .....                   | 158           | Softwide .....                       | 246                               |
| Comp-U-Kids .....                        | 245                      | K&K Computerware .....                     | 265           | Soundworks Productions .....         | 208                               |
| Compukit .....                           | 43                       | Key Color Software .....                   | 100           | Southern Software Systems .....      | 182                               |
| Computer Accessories<br>of Arizona ..... | 189                      | KRT Software .....                         | 160, 196      | Spectral Associates .....            | 209, BC                           |
| Computer Dynamics .....                  | 116                      | Land Systems .....                         | 194           | Spectrum Projects<br>.....           | 155, 157, 159, 161, 162, 163, 165 |
| The Computer House .....                 | 59                       | Leader Sales Corporation .....             | 252           | Speech Systems .....                 | 147                               |
| Computer Island .....                    | 215                      | Liberty Hill Software .....                | 42            | Star-Kits .....                      | 121                               |
| Computer Plus .....                      | 3                        | Mark Data Products .....                   | 133, 192, IBC | Hoyt Stearns Electronics .....       | 102                               |
| Computer Shack .....                     | 271, 272, 273            | Market Timing .....                        | 241           | Sugar Software .....                 | 75                                |
| Computers Unlimited .....                | 112                      | Marymac Industries .....                   | 253           | Superior Oracle Software .....       | 66                                |
| Computer Systems Center .....            | 113                      | Med Systems Software .....                 | 227           | T & D Software .....                 | 299                               |
| Computerware .....                       | 21, 35, 40, 115<br>..... | Micro Catalog .....                        | 278           | Teksym .....                         | 223                               |
| .....                                    | 132, 244, 281, 252       | Micro-80 .....                             | 302           | Transformation Technologies<br>..... | 184                               |
| Creative Electronics .....               | 48                       | Micrologic .....                           | 107           | Transition Technology .....          | 212                               |
| Control Craft, Inc .....                 | 81                       | Micronix .....                             | 17            | 29 Enterprises .....                 | 30                                |
| Creative Technical .....                 | 285                      | Micro-Products Division .....              | 206           | Vidron .....                         | 29                                |
| Crimson Software .....                   | 202                      | Micro Technical Products .....             | 289           | Wasatchware .....                    | 104                               |
| Custom Software Engineering .....        | 117                      | The Micro Works .....                      | 205           | Washington Computer Services .....   | 76                                |
| Data-Comp .....                          | 118                      | Mr. R's Software .....                     | 177           | Winstead Co., Inc. ....              | 134                               |
| Datacomp Computer Systems .....          | 22                       | Tom Mix Software .....                     | 98, 99, IFC   | Word Merchant .....                  | 232                               |
| Dataman .....                            | 187                      | ML-US'R Software .....                     | 56            | World Electronics .....              | 128                               |
| Datasoft .....                           | 49                       | Moreton Bay Laboratory .....               | 66, 93        | York-10 .....                        | 105                               |
| Delker Electronics .....                 | 33, 209                  | Nanos Systems Corp. ....                   | 303           | Zeta Software .....                  | 213                               |
| Derringer Software .....                 | 50                       |                                            |               |                                      |                                   |



FAST, EFFICIENT  
MACHINE LANGUAGE



### NEW ARCADE GAMES

GLAXXONS / EL BANDITO / COSMIC CLONES / BUMPERS

### ARCADE GAMES

HAYWIRE / ASTRO BLAST / CAVE HUNTER / SPACE RAIDERS  
ARCADE GAMES, CASSETTES 24.95—REQUIRE 16K / DISC 29.95—REQUIRES 34K

### ADVENTURE GAMES

CALIXICO ISLAND / THE BLACK SANCTUM  
ADVENTURE GAME CASSETTES 19.95—REQUIRES 16K

**BUY FROM YOUR FAVORITE DEALER OR DIRECT FROM**

MARK DATA PRODUCTS

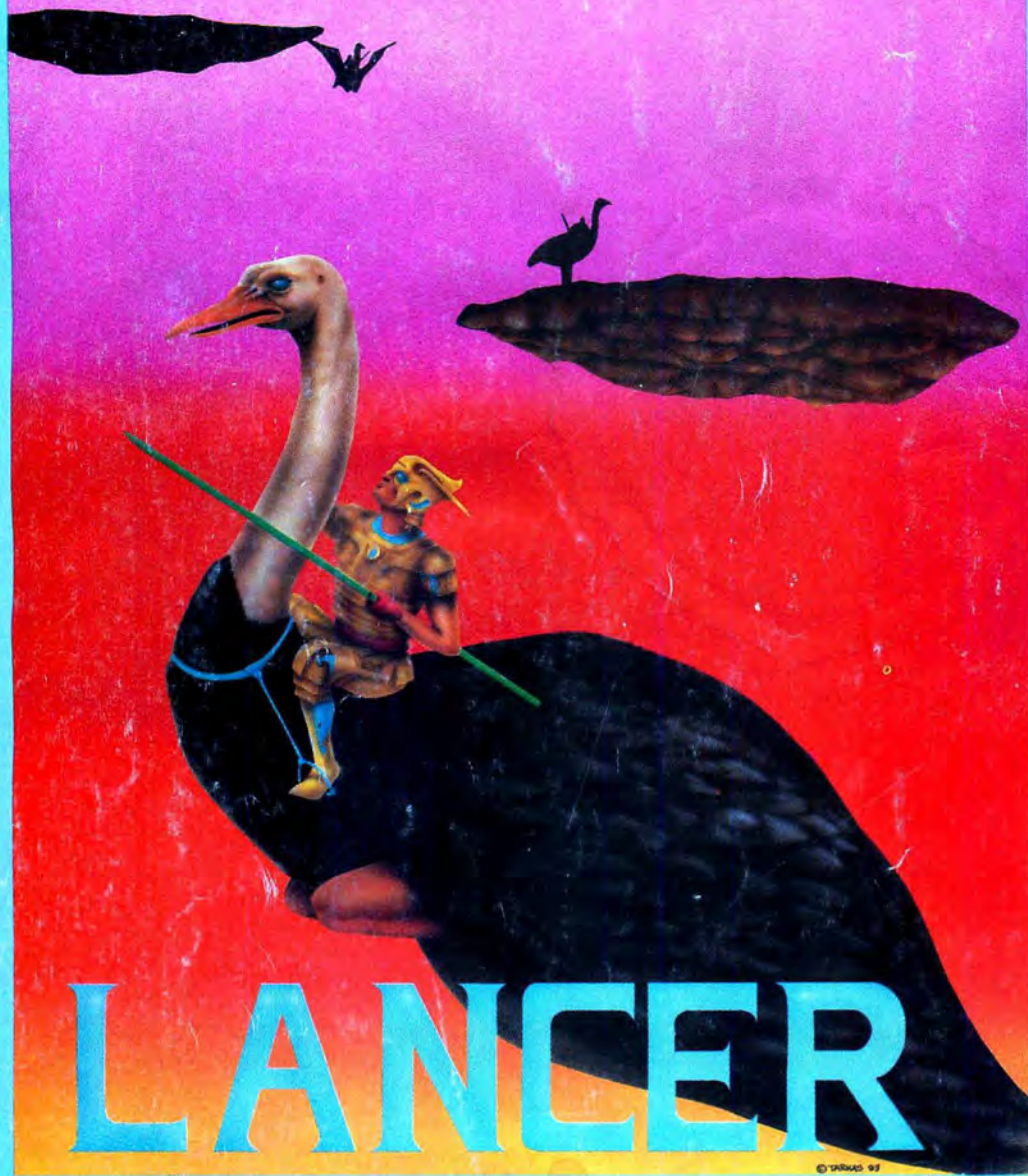
24001 ALICIA PKWY., NO. 226, MISSION VIEJO, CA 92691 • (714) 768-1551

We pay shipping on all orders in the continental U.S. and Canada. Overseas add \$3.00. California residents, please add 6% sales tax. We accept MasterCard and VISA. We are always looking for quality machine language programs. Contact us for details.



*Mark Data Products*





Tension mounts as you lower your magic lance and maneuver your bird into position for the final run of the journey. Will Death Flyer, despised arch enemy, emerge victorious or will your attack be sure and strong, dismounting and grinding him into the island dust.

You concentrate on Death Flyer, the flags go down, and you're off! Your bird races faster and faster gaining speed for the flying leap between floating islands. Now comes the fatal decision!

Your magic lance dismounts your opponent into a ball of suspended life energy. If you're quick you can absorb him before he regains his shape.

But watch out for your deadliest enemy, **The Invincible Deadly Buzzard**, for its slightest touch will destroy you. At last, you win the day placing yourself in the most envied court position possible!

You are playing **LANCER**, the revolutionary new "JOUST" type game available from Spectral Associates.

by Rick LaMont

**SPECTRAL ASSOCIATES MAKES THE BEST HI RES GRAPHICS GAMES FOR THE COLOR COMPUTER! TRY THE BEST YOUR MONEY CAN BUY:**

**GHOST GOBBLER  
PLANET INVASION  
MS. GOBBLER  
WHIRLYBIRD RUN  
DONKEY KING**

**COLOR COMPUTER**  
Quality Hardware and Software Support  
**TRS-80 • TDP SYSTEM 100 • DRAGON 32**  
For Orders Only Call or write for a complete catalog  
Business Office and Information Call:  
.....(206) 581-6938  
Office open 8:30-4:30 P.S.T.  
**1-800-426-1830**  
except WA, AK, HI  
We accept Visa, MASTERCARD, AMERICAN EXPRESS  
All prices U.S. Funds. Add 3% for shipping, No C.O.D. WA residents add 7.8% sales tax.

**SPECTRAL ASSOCIATES**  
3416 S. 90th Tacoma, WA 98409

**DEALER INQUIRIES INVITED**